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## THE XXXIVTH NATIONAL CONFERENCE

The Tuberculosis Association of India organises the National Conference on Tuberculosis and Chest Diseases every year. Since 1948 these Conferences are being hosted by State Associations. They provide a forum for discussing different aspects of Tuberculosis and other Chest Diseases, exchanging information and comparing notes and putting across new ideas and new hypotheses among TB workers. An opportunity is also provided for social get-together where the young workers meet and come to know the leaders in the profession more intimately.

The Rajasthan State Tuberculosis Association had the privilege of hosting the Thirty-fourth National Conference in Jaipur from the 28th to 31st October, 1979. The Conference was held in the spacious auditorium of the S.M.S. Medical College, Jaipur. Over 350 delegates, including distinguished scientists from abroad, attended. Dr. M.L. Mehrotra, Director-Professor, Tuberculosis Training and Demonstration Centre and Chest Institute, Agra, presided. The Conference was formally inaugurated by Shri Bhairon Singh Shekhawat, Chief Minister of Rajasthan. In his brief but thought-provoking address Shri Shekhawat pointed out that the benefits of the national programme had not yet reached the under-privileged persons, especially at the periphery, and stressed the need for creating an awareness amongst the population about the problem of tuberculosis and the facilities available for its control. Earlier Dr. G.C. Sharma, Principal of the S.M.S. Medical College and Chairman, Reception Committee of the Conference, welcomed the delegates. Shri Trilok Chand Jain, Health Minister of Rajasthan, whose Address was read out in his unavoidable absence, briefly referred to the philosophy of health care that was being followed by the Rajasthan Government and stressed the need for removing ignorance and superstition about the disease which was still rampant in the country. Dr. B.M. Sharma, Director of Health Services, Rajasthan, highlighted the main features of the tuberculosis programme in Rajasthan. Dr. B. Sankaran, Director General of Health Services and Chairman, Tuberculosis Association of India, gave a brief resume of the functioning of the National Tuberculosis Programme in the whole country and praised the efforts of the Tuberculosis Association of India and its affiliates in the States in supplementing Governmental efforts in implementing the National Programme.

Dr. M.L. Mehrotra in his Presidential Address referred to the shortfall in the achievements of the National Tuberculosis Programme and suggested various procedures which, he felt, were necessary for stepping up the activities to reduce the shortfall.

The Scientific Sessions inaugurated by Dr. B. Sankaran, covered important subjects like Organisational and Administrative problems in the Implementation of the National Programme, Present day Management of Pulmonary Tuberculosis, Chemotherapy, Chronic Obstructive Pulmonary Diseases, Prevalence and Incidence of Tuberculosis and other Chest Diseases in Industrial Workers, etc.

Dr. H.B. Dingley, whom the Association had selected for the Wander-TAT Oration, gave an interesting discourse on "Tuberculosis in Infants and Children". He dealt with the problem lucidly and exhaustively by presenting the results of a survey conducted by him and his associates covering children even below the age of 5 years who are usually not covered in most surveys in whom diagnosis is often difficult.

Prof. G. Dahlstrom of Sweden delivered a special lecture on Chronic Respiratory Insufficiency and Prof. A. Hanngren on Sarcoidosis. Both the presentations were very informative, interesting and exhaustive.

The Symposium on Organisational and Administrative Problems in the Implementation of the National Tuberculosis Programme was chaired by Dr. N.L. Bordia and eight eminent workers, including the Tuberculosis Adviser to the Government of India, participated in it. The discussions brought out the serious consequences of the recent modifications in the organisational pattern and lack of central supervision of the NTP. It was suggested that the Government should bring together a small working group drawn from all parts of the country to discuss in depth the programme in all its aspects and suggest ways and means to improve the output.

Three sessions were devoted to the important subject of Chemotherapy. The first of these was a panel discussion on "Present-day Management of Pulmonary Tuberculosis" moderated by Dr. S. P. Pamra. The second session dealt with the problem of Short-term Chemotherapy. The final results of the short-term chemotherapy trial conducted by the Tuberculosis Association of India were presented by Dr. R. Viswanathan, Chairman of the Research Committee of the Association. In the third session a number of assorted papers on various aspects of chemotherapy were presented.

Dr. G.V.J. Baily reported briefly the results of the first  $7\frac{1}{2}$  years follow-up of the Tuberculosis Prevention Trial in Chingleput. Publication of the interim report having led to lot of adverse publicity in the lay press and doubt and misunderstanding among general public, five senior workers were requested to briefly share their views with the audience. The consensus was that the present policy in respect of vaccination of the infants and children in the younger age groups only should continue as at present.

Four papers were presented in the session on "Extra-Pulmonary Tuberculosis". These included Results of Short-term Treatment with Rifampicin containing regimens in Tuberculous Meningitis and Tuberculosis of the Spine, Results of Biopsy of Cervical Glands, and the Problem of Atypical Mycobacteria in U.S.A. and other Western Countries.

A session was devoted to the Organisational Problems of Domiciliary Treatment. The papers presented brought out the necessity for defaulter action and also the importance of motivation in ensuring regular intake of drugs. Six papers were presented in the session on Chronic Obstructive Pulmonary Disease dealing with the aetiological, physiological and clinical aspects of this problem.

Four sessions were devoted to free communications dealing with case-finding, BCG vaccination, Administration of Levamisole as an adjunct in the treatment of pulmonary tuberculosis, Significance of Lepromin test, Respiratory disorders in children, Management of pulmonary giant cavities by external cavity drainage, etc.

Drs. J.L. Bhatia of Amritsar. K.V. Krishnaswami of Madras, P.A. Deshmukh of Jamshedpur and Bhagat Singh Alag of Jabalpur were re-elected as representatives of the Conference on the Central Committee of the Tuberculosis Association of India.

Dr. Gauri Shankar Sharma, Honorary Secretary, Rajasthan State TB Association, assisted by an efficient Organising Committee, made excellent arrangements for the Conference. A Souvenir was also brought out on the occasion. The delegates were entertained to cultural shows on two evenings during the Conference.

As has been the experience in recent years, all the sessions of the Conference were very well attended. A noteworthy feature is that more and more younger workers are now coming forward to present papers and participate in the discussions. This augurs well for the future. We are confident that delegates left Jaipur with the satisfaction that the Conference provided extremely interesting fare, well worth the time, energy and money spent by them.

Some of the papers presented at this Conference and summaries of all other papers are given in the following pages.

**SHORT-TERM CHEMOTHERAPY OF PULMONARY TUBERCULOSIS  
— A CONTROLLED TRIAL**

TUBERCULOSIS ASSOCIATION OF INDIA\*

**Summary.** Two short-term (20 weeks) chemotherapy regimens, one consisting of INH, Streptomycin and Ethambutol and the other Pyrazinamide, INH, Streptomycin and Ethambutol were compared with a standard regimen of Streptomycin and INH for 8 weeks followed by INH and Thiacetazone for 72 weeks. Two hundred and twenty seven patients in all were randomly allocated to the 3 regimens. Toxic reactions were negligible in all regimens. Patients in the trial regimens were hospitalized for the entire duration of chemotherapy viz. 20 weeks and patients in the standard regimen were hospitalized only for the first 8 weeks. All patients took the drug with a high degree of regularity. Sputum conversion at the completion of treatment was nearly 100% in all 3 regimens. Radiological changes were also more or less similar. Patients were followed for a total period of 132 weeks. The rate of worsening in the follow up period was 16.4% in the Rifampicin regimen, 32.2% in the Pyrazinamide regimen and 11.2% in the control regimen. The observed rate of worsening was more amongst those with more extensive disease, cases with multiple cavities and those who took longer time to get converted initially although these differences did not attain statistical significance. Sputum conversion rate was fairly high even in patients with initial drug resistance.

A co-operative trial on the short-term chemotherapy of pulmonary tuberculosis, sponsored by the Research Committee of the Tuberculosis Association of India, was carried out at three institutions in Delhi. viz. L.R.S. Tuberculosis Hospital, Mehrauli, R.B. Tuberculosis Hospital and the New Delhi Tuberculosis Centre. The trial started in March, 1974 and the present communication incorporates both the immediate and the long-term results.

Two short-term regimens and one conventional regimen (control) were studied in the trial. These were :

- Group A INH + Streptomycin + Ethambutol + Pyrazinamide for 20 weeks; Placebo (Calcium Lactate) 21 to 80 weeks.
- Group B INH + Streptomycin + Ethambutol + Rifampicin for 20 weeks; Placebo (Calcium Lactate) 21 to 80 weeks.
- Group C INH + Streptomycin for 8 weeks; INH and Thiacetazone from 9 to 80 week.

The dosages of the various drugs used were as follows :-

Streptomycin	0.75 g daily
I.N.H.	300 mg once daily
Ethambutol	25 mg/kg for first 6 weeks and 15 mg/kg thereafter, once daily
Pyrazinamide	750 mg B.D.
Rifampicin	600 mg once daily
Thiacetazone	150 mg once daily

The protocol permitted substitution of PAS for streptomycin (in group B) and for thiacetazone (in Group C) if toxicity developed at any stage.

Freshly diagnosed, previously untreated patients aged 15 to 45 years reporting at the participating institutions during the period of intake who on enquiry were found to be bona fide residents of Delhi were eligible for the study. Exclusion criteria were (i) pregnancy, (ii) extra-pulmonary tuberculosis (iii) co-existing non-tuberculous disease which might interfere with anti-TB treatment such as diabetes; (iv) pleurisy obscuring more than one-third of the lung field (v) disease involving more than four lung zones (vi) prior general contraindications (vii) weight less than 36 kg.

Patients found suitable for the study were randomly allocated to one of the three regimens mentioned earlier by means of sealed envelopes. The first 20 weeks' treatment in groups A and B and the first 8 weeks' treatment in group C was carried out in hospital. For the remaining period of treatment patients collected 4-weekly supplies of drugs or placebo from the domiciliary treatment service. After discharge from hospital, the patients were carefully followed up in their homes to ensure regularity of treatment and periodic assessment. During the entire 80 weeks' period, patients were subjected to 4-weekly sputum examination (2 specimens. 1 spot and 1 sputum).

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\*The trial was planned and supervised and the report prepared by the Research Committee consisting of Dr. R. Viswanathan (Chairman), Dr. S. P. Pamra, Dr. H.B. Dingley and Dr. M.M. Singh. Culture and sensitivity testing was carried out at the laboratory of the New Delhi Tuberculosis Centre under the supervision of Dr. V.K. Perumal. Statistical aspects of the study were looked after by Shri G.P. Mathur, Statistician, New Delhi Tuberculosis Centre.

tion) by direct microscopy and culture. Where sputum was not forthcoming, a specimen obtained by tickling the throat and asking the patient to spit was examined instead. Radiological examination was carried out on completion of 2, 20, 40, 52 and 80 weeks' treatment. Besides routine blood and urine examinations, liver function tests (SCOT, SGPT) and ophthalmic tests were carried out both at start and on completion of 20 weeks' treatment.

On completion of 80 weeks' treatment, patients were kept under observation for a further period of 52 weeks during which they underwent quarterly bacteriological and radiological examination on the same scale as during the earlier treatment. Patients were also instructed to attend the centres between routine examinations if they had any symptoms suggesting relapse. On such occasions, the same radiological and bacteriological examinations were carried out as during routine visits.

Changes in chemotherapy were made permissible with the concurrence of the Research Committee and only in those patients who showed either major toxic reactions or definite clinical or radiological deterioration or if the sputum continued to be positive upto 26 weeks.

**Results**

In all, 227 patients were inducted in the trial. Some of these were however found to be unsuitable for the study in the light of later information; initial sputum cultures of 8 turned out to be negative, 1 had had earlier anti-tubercular treatment, which fact was not disclosed at time of intake and 4 violated the protocol in other respects. Apart from these, initial sputum

cultures of 29 patients turned out to be resistant to one or more of the drugs that they were prescribed and these patients therefore had to be excluded from the main analysis. This analysis, thus, is based on 185 patients (60 in Group A, 63 in Group B and 62 in Group C).

Patients in the 3 groups were, by and large, similar in essential respects at start. Nearly 36% had disease involving one lung, 18% had no cavitation, 44% had only a single cavity, and the remaining 38% had multiple cavitation; the proportion of cases having disease in 1, 2, 3 and 4 lung zones was, in that order, 5%, 46%, 41% and 8%. Of the 185 patients, 143 (77%) were males; 92 (50%) were between 15 and 25 years old, 65 (35%) were between 26 and 35 years old and the remaining 28 (15%) between 36 and 45 years old.

Toxic reactions noted during the course of the trial were generally not of a serious nature. Only 2 patients, both in Group B had to be taken off the trial due to intractable toxicity, one to streptomycin and the other to Ethambutol. Apart from these, there were 23 patients in Group A, 19 in Group B and 15 in Group C who had various transitory toxic symptoms, details of which are given in Table 1. In these patients the toxic symptoms either disappeared by themselves or after temporary stoppage of the offending drug or by temporary addition of anti-histaminics.

A very small number of patients was lost to observation during the course of the trial: Most of the others were extremely regular during treatment, including the domiciliary phase.

One death due to non-tuberculous causes

Table 1

*Toxic symptoms noted during the trial*

Group A		Group B		Group C	
Joint pains	8	Vomiting(EM)	1*	Rash	5
Cramps	6	Giddiness(SM)	1*	Giddiness	4
Gynacomastia	1	Rash	8	Nausea	6
Fits	1	Cramps	3		
Rash	7	Nausea etc.	8		

\*Removed from the Trial

(cor pulmonale) was recorded in Group A during the 9th week of treatment.

Bacteriological conversion (by culture) obtained at successive periods is shown in Table 2. In the two short-term regimens the rate of sputum conversion was somewhat faster than in the control group, in the sense that substantially larger percentage of patients were converted in the earlier stages. However, at the end of 20 weeks (when active treatment in Groups A and B ceased.) there was no statistically significant difference ( $P > 0.90$ ) between the conversion rates in the 3 groups (100.0% in Group A, 98.3% in Group B and 96.6% in Group C).

It is worth noting that in the early stages of

treatment there was a very considerable number of patients who were found positive on direct microscopy but who were negative by culture. Of the 178 patients assessed at 4 weeks, as many as 48 (27%) were in this category, the percentage being particularly high in Group A (35%) and Group B (31.2%). At 8 weeks the proportion was 28 (16%) out of 179 assessed, all 3 regimens being more or less similar. At subsequent stages this proportion was comparatively negligible e.g. at 20 weeks only 6(3.5%) out of 173 were positive by direct microscopy but negative by culture.

Radiological changes at 20 weeks were more or less similar in the 3 groups as can be seen from Table 3. The differences were not statistically significant ( $P > 0.90$ )

Table 2  
*Bacteriological conversion fates during successive stages 0-20 weeks*

	4 Weeks		8 Weeks		12 Weeks		16 Weeks		20 Weeks	
	Number assessed	Number sputum converted	Number assessed	Number sputum converted	Number assessed	Number sputum converted	Number assessed	Number sputum converted	Number assessed	Number sputum converted
A	56	35 62.5%	58	51 87.9%	57	54 94.7%	56	56 100.0%	55	55 100.0%
B	61	41 67.2%	61	57 93.4%	59	58 98.3%	59	58 98.3%	59	58 98.3%
C	61	25 41.0%	62	49 79.0%	61	57 93.4%	59	57 96.6%	59	57 96.6%

Table 3  
*Radiological changes at 20 weeks*

	Number assessed	Marked improvement	Slight or no improvement	Worse
A	56* 100.0%	43 76.8%	13 23.2%	*
B	60 100.0%	44 73.3%	16 26.7%	0.0%
C	59 100.0%	42 71.2%	15 25.4%	2 3.4%

\*One non-TB death in Group A in the 9th week has not been shown here.

To decide whether the satisfactory results obtained at 20 weeks in Groups A and B could be maintained after stoppage of treatment at that stage, all subsequent worsenings (bacteriological and/or radiological) noted during successive periods upto 132 weeks among patients attaining sputum conversion at 20 weeks were recorded. Similar data were also collected for Group C (Control Group) patients, who, it would be recalled, continued on treatment upto 80 weeks. These are shown in Table 4 for five successive periods. Bacteriological proof of worsening was found in all except 4 cases in Group A and 2 in Group B where only radiological and clinical evidence was available. Radiological evidence of

worsening in all these cases was unequivocal.

Patients getting worse during an earlier period or otherwise not available for assessment have been excluded from the "average number at risk" shown in Table 4. Data obtained for successive periods have been combined by the modified life-table method (which assumes that the small number of patients not available for assessment at any stage would have behaved the same way as those who were assessed) to give cumulative rates shown in Table 5. At 132 weeks the worsenings in Group A were significantly more than in Group C ( $P < 0.05$ ) but there was no significant difference between Groups B and C.

Table 4

*Worsenings during successive periods 20-132 weeks*

	20-40 Weeks		41-64 Weeks		65-80 Weeks		81-104 Weeks		105-132	Weeks
	Average number at risk	Worsenings	Average number	Worsen-at risk	Average number	Worsen-at risk	Average number	Worsen-at risk	Average number at risk	Worsenings
A	52.0	6 11.5%	44-5 6 13.5%	36.5 1 2.7%	33-5 1 3.0%	32	2 6.2%			
B	58.0	4 6.9%	53.0 2 3.8%	50.0 2 4.0%	39.5 0.0%	36	1 2.8%			
C	55.0	3 5.4%	49.0 3 6.1%	43.0 — 0.0%	38.0 — 0.0%	35.5	— 0.0%			

Table 5

*Worsenings at successive sines 20-1 32 weeks\* (Cumulative Rates)*

	Worsenings (Percentages)				
	20-40 weeks	20-64 weeks	20-80 weeks	20-104 weeks	20-132 weeks
A	11.5%	23.4%	25.5%	27.8%	32.2%
B	6.9%	10.4%	14.0%	14.0%	16.4%
C	5.4%	11.2%	11.2%	11.2%	11.2%

\*Calculated by the modified life-table method

It was one of the objects of the present study to find out whether, even if the short-term regimens under trial were not found satisfactory on the whole, there was any sub-group of patients for which one or both of these regimens could be considered adequate. Sub-groups of special interest were those who had less extensive disease at start, those with no or a single cavity and those who obtained sputum conversion fairly quickly. Data regarding cumulative rate of worsening (from 20 weeks to 132 weeks) were therefore regrouped according to these factors and the results are shown in Tables 6, 7 and 8.

The observed worsening rate among patients

with 1 or 2 lung zones involved (Table 6) appears to be lower than those with more extensive initial disease but the differences do not attain statistical significance although in Group, B they just fail to do so ( $0.05 < P < .10$ ). Similarly, there is a suggestion that worsenings in Groups A and B are more frequent in the multiple cavitation sub-group (Table 7) but the differences are not significant. Also, although it appears (Table 8) that patients in Groups A and B who take a longer period to attain bacteriological conversion worse than those who attain this goal faster, the differences, once again, are not statistically significant ( $P > 0.10$ ).

Table 6

*Worsening 20-132 weeks related to initial extent of disease*

	1, 2 Zones		3, 4 Zones	
	Patients sputum converted at 20 weeks	Worsenings 20-132 weeks	Patients sputum converted at 2 weeks	Worsenings 20-132 weeks
A	34	27.2%	21	42.3%
B	31	6.5%	27	29.1%
C	24	0.0%	33	18.7%

Table 7

*Worsenings 20-132 weeks related to initial cavitation*

	No or single cavity		Multiple cavities	
	Patients sputum converted at 20 weeks	Worsenings 20-132 weeks	Patients sputum converted at week*	Worsenings 20-132 weeks
A	34	26.4%	21	41.5%
B	39	13.0%	19	23.7%
C	35	5.9%	22	0.0%

Table 8

*Worsenings 20-132 weeks related to time taken for bacteriological conversion*

	Sputum converted at 4 weeks		Sputum converted later than 4 weeks	
	Patients converted at 20 week-;	Worsenings 20- 132 weeks	Patients converted at 20 weeks	Worsenings 20-132 weeks
A	33	24.4%	22	43.0%
B	37	11.6%	21	24.0%
C	21	10.7%	36	11.5 %

In interpreting these data, one should not lose sight of the fact that the three characteristics considered (extent of disease, cavitation and time taken to attain bacteriological conversion) may be correlated with each other.

An interesting fact noted during the post-treatment follow up in Groups A and B was that in many patients radiological clearing continued even after stoppage of active treatment at 20 weeks. Such clearing was noted in 12 of the 30 Group A patients who were available for follow up upto 132 weeks and in 1 of the 9 who were lost to observation before completion of 132 weeks. The corresponding figures for Group B are: 14 out of 35 completing 1 32 weeks and 6 out of 8 dropping out before completing 132 weeks.

Drug resistance emerged in most patients not responding to treatment. Excluding patients who had only radiological worsening there were 26 patients {12 in Group A, 8 in Group B and 6 in Group C) who were bacteriologically positive by culture at 80 weeks. As many as 11 of the 12 patients in Group A were resistant to one or more drugs (8 to INH, 10 to Pyrazinamide, 4 to Ethambutol and 3 to Streptomycin). In Group B, 7 of the 8 were drug resistant (6 to INH, 3 to Rifampicin, 2 to Ethambutol and 4 to Streptomycin). In Group C, all 6 were resistant to INH and all but 1 to Thiacetazone.

To conclude one might say that among initially drug sensitive patients, both regimens A and 8 gave satisfactory immediate results. The long-term results in Group B were more or less of the same order as in control Group C but the worsening rate in Group A was unacceptably high.

An analysis of initially drug resistant patients who were not included in the main analysis suggests that immediate results obtained among these were also fairly satisfactory; 7 out of 8 completing 20 weeks' treatment in Group A, 7 out of 7 in Group B and 7 out of 9 in Group C obtained bacteriological conversion by culture. Follow up upto 52 weeks showed that 1 out of 7 in Group A, 2 out of 7 in Group B and none out of 5 in Group C (in which active treatment was still continuing) got worse. The numbers are too small for any firm conclusion.

#### Acknowledgements

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## CHEMOTHERAPY OF TUBERCULOUS MENINGITIS WITH ISONIAZID PLUS RIFAMPICIN—INTERIM FINDINGS IN A TRIAL IN CHILDREN\*

PADMA RAMACHANDRAN

**Summary:** Seventy six cases of tuberculous meningitis admitted to the Institute of Child Health and Hospital for Children, Madras were treated with a regimen of rifampicin, isoniazid and streptomycin daily for two months, followed by streptomycin twice a week plus ethambutol and isoniazid daily for 4 months. Treatment with isoniazid and ethambutol daily was continued for a further period of 6 months. In the earlier part of the study, isoniazid was prescribed in a dosage of 20 mg/kg, noted that about half of the children on isoniazid 20 mg/kg developed clinical jaundice with elevated levels of serum bilirubin and SOD and SGPT levels. It was considered likely that the high dosage of isoniazid might have contributed to the high incidence of jaundice and hence the dosage of the was reduced to 12 mg/kg. With the reduced dosage of isoniazid, the incidence of jaundice was much lower, namely 20%. 54 patients have so far completed the treatment period of 1 year. 13 of these died after admission to the study. The clinical and laboratory findings are presented.

Amongst all forms of tuberculosis, tuberculous meningitis still carries a high mortality and morbidity. This is due to the lack of established diagnostic criteria in the absence of bacteriological evidence and also because of the prolonged nature of therapy leading to irregular and incomplete treatment in the later months of chemotherapy.

The advent of the bactericidal drug rifampicin and the re-entry of pyrazinamide in the field of chemotherapy have dramatically changed the prospects of developing regimens which produce sterilisation of tuberculous lesions and have helped in reducing the duration of chemotherapy of pulmonary tuberculosis from the conventional 12-18 months to about 6 months. Rifampicin has been found to enhance the efficacy of regimens even when given only for the first two months. The combination of rifampicin plus isoniazid has also been found to be highly effective in the treatment of tuberculosis of the spine in Madras patients. Information on the value of rifampicin in the chemotherapy of tuberculous meningitis is limited. The high efficacy of rifampicin-regimens in pulmonary tuberculosis and tuberculosis of the spine suggest, that rifampicin-containing regimens would be of great value in the treatment of tuberculous meningitis. The interim findings of a study which is being undertaken to investigate the efficacy of a rifampicin-containing regimen in tuberculous meningitis in children in Madras are presented in this paper.

The study is being conducted by the Tuberculosis Research Centre of the Indian Council of Medical Research in collaboration with the Institute of Child Health and Hospital for Children, Madras from where the patients are drawn.

### Materials & Methods

76 cases of TB meningitis aged between 1 and 12 years who had not received more than two weeks of previous anti-tuberculosis treatment were admitted to the study.

#### Criteria for diagnosis:

**Clinical :** Presence of signs like fever, vomiting, irritability, apathy, refusal to play, anorexia and constipation in the early stages followed by well marked meningeal signs, mental confusion, neurological signs, coma and widespread paralysis.

#### CSF Changes :

Protein content more than 40 mg %

Sugar Content less than 50 mg %

Cells more than 10/cmm. predominantly lymphocytes.

### Investigation

The following investigations were carried out :

1. *Mantoux test:* A 1 TU Mantoux test (PPD batch RT 23 with tween 80) on admission
2. X-Ray Chest on admission and at the end of treatment.
3. X Routine urine analysis and titration of acetyl isoniazid, bile salts, bile pigments and urobilinogen every month.
4. Estimations of SGOT, SGPT activity,

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\*\*Tuberculosis Research Centre, Madras-600031.

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serum bilirubin, blood Urea and Creatinine on admission, at 1 and 2 months and at the end of chemotherapy.

5. Estimation of haemoglobin, blood platelet count, total and differential white blood cell counts on admission, at 1 and 2 months and at the end of chemotherapy.

6. CSF examination for biochemical, cytological, smear and bacteriological examinations on admission and every two weeks thereafter,

*Staging on admission:*

At the time of admission patients were examined in detail with special reference to nervous system. They were classified into 3 stages (Table I) according to the British Medical

Table 1

*Staging on Admission*

Stage	Patients	
	No.	%
I	9	12
II	62	82
III	5	6
Total	76	100

Research Council (1948) classification. Cases were divided into:

*Stage I :* Patients were fully conscious and rational with signs of meningeal irritation but with no focal neurological signs or signs of hydrocephalus.

*Stage II:* Patients were mentally confused and/or had such neurological signs as squints or hemiparesis.

*Stage III :* Patients were mentally inaccessible owing to the depth of stupor or delirium on admission and/or had a complete hemiparesis or paraplegia.

*Treatment Schedules:*

All patients were treated for a period of 12

months. During the first 2 months, the patients were treated with 3 drugs-streptomycin, isoniazid and rifampicin daily (Table 2). During 3-6 months, they received ethambutol plus isoniazid daily, supplemented by streptomycin administered twice a week. During the last 6 months, they were treated with ethambutol plus isoniazid daily.

Table- 2

*Drug Regimens*

Month	Drugs
0-2	Streptomycin, isoniazid and rifampicin daily.
3-6	Ethambutol and isoniazid daily plus Streptomycin twice— weekly.
7-12	Ethambutol and isoniazid daily.

Streptomycin was employed in a dosage of 40 mg/kg body-weight, rifampicin 12 mg/kg daily and ethambutol 17.5 mg/kg daily (Table-3). "The first 26 patients were treated with isoniazid in a daily dosage of 20 mg/kg, a dosage commonly used by most Indian paediatricians for the treatment of tuberculous meningitis. However, a large number of them developed clinical jaundice during the initial phase of treatment with isoniazid and rifampicin. It was considered likely that the high dosage of isoniazid might have contributed to the high incidence of hepato-toxicity. Patients admitted to the study subsequently were all treated with a lower dose namely, 12 mg/kg isoniazid.

Table .1  
*Dosages and dosages*

Streptomycin	40 mg/kg.
Rifampicin	12 mg/kg.
Ethambutol	17.5 mg/kg.
Isoniazid	20 mg/kg (26 pts.) 12 mg/kg(50pts)

Results

*Characteristics on admission:*

All the patients in the study were under 7 years of age, and 88% were aged 4 years or less (Table 4).

Table 4

*Age distribution*

Age (years)	Patients	
1	26	34%
2	15	20%
3	11	14%
4	15	20%
5	5	7%
6	4	5%
7—12	0	0
Total	76	

Table 5

Mantoux results

Induration (mm)	Patients	
0	26	34%
1-4	10	13%
5-9	3	4%
10-14	13	17%
15-19	16	21%
20-29	7	9%
N.A.	1	1%
Total	76	

Tuberculin test was positive with indurations of 10 mm or more in about half of the patient. (Table 5). The remaining patients had reactions of less than 10mm( including a third (34%) who had a reaction of '0' mm. Cerebrospinal fluid was positive for Mycobacterium tuberculosis in 30% of the cases (table 6). Thirty four (45%) patients had a history of contact with pulmonary tuberculosis and 38 (50%) had an abnormal chest X-ray suggestive of pulmonary tuberculosis.

*Clinical Progress:*

Of the 76 patients, 54 have completed 1 year of treatment. Of these, 13 (24%) patients died after admission to the study. 20 (37%) patients made a complete recovery and the remaining 21 (39%) patients also recovered but had been left with residual damage, which was considered to be severe in 15% and mild to moderate in 24% (Table 7). Mild residual damage implied such sequelae as Interactivity, irritability, mild perceptual defects and slight motor impairment like facial paresis or monoparesis. Moderate residual damage included such defects as hemiparesis involuntary movements and menial dullness. Severely damaged children usually remained unconscious or if consciousness was regained they were incapable of independent life.

Table 6

*Bacteriological findings on admission*

Stages	Patients		Culture Positive
<b>I</b>	<b>9</b>	<b>12%</b>	<b>4</b>
<b>II</b>	<b>62</b>	<b>82%</b>	<b>18</b>
<b>III</b>	<b>5</b>	<b>6%</b>	<b>1</b>
<b>Total</b>	<b>76</b>		<b>23(30%)</b>

*Hepatotoxicity:*

As pointed out earlier the first 26 cases were given isoniazid in a dosage of 20 mg/ka daily. Four cases died before completing the rifampicin therapy (Table 8); they did not have hepatic toxicity and are excluded from the analysis. Out of the remaining 22 cases, 11 (50%) developed clinical jaundice with elevated serum bilirubin levels and a significant rise in the SGOT and SGPT levels. The treatment in these cases was suitably modified.

Table 7

*Status at 1 year*

Stage	No. of patients	Deaths	Residual damage		Complete recovery
			Severe	Mod/Mild	
I	7	0	1	0	6
II	45	]]	7	13	14
III	2	2	0	0	0
All	54	13 (24%)	8 (15%)	13 (24%)	20 (37%)

Table 8

incidence of jaundice in the first two months

	High Dose INH20mg/kg	Low Dose INH 12mg/kg
No. of patients	26	50
Deaths	4	10
No. in analysis	22	40
Developed Jaundice	11(50%)	8(20%)

It was considered likely that the high dosage of isoniazid (20 mg/kg) when given in combination with rifampicin may have contributed to the high incidence of jaundice. The daily dosage of isoniazid was, therefore, reduced to 12 mg/kg in the subsequent part of the study. Fifty patients were treated with the regimen containing the lower dosage of isoniazid. Ten patients died before completing the two months of treatment

and none of them had hepatic toxicity. Out of the remaining 40 cases, 8 developed jaundice with elevated bilirubin, SGOT and SGPT levels. Thus there was a reduction in the incidence of jaundice following reduction of the dosage of isoniazid, but the incidence is still high. This suggests that the use of a combination of isoniazid plus rifampicin entails a high risk of hepatotoxicity in children with tuberculous meningitis.

### Conclusions

In conclusion, the combination of isoniazid 20 mg/kg plus rifampicin administered daily was associated with high and unacceptable levels of hepatotoxicity in children with tuberculous meningitis: the incidence was substantially lower in children treated with a lower dosage of isoniazid, namely 12 mg/kg, plus rifampicin. The results of chemotherapy with a regimen of isoniazid plus rifampicin daily for 2 months, followed by ethambutol plus isoniazid daily for 10 months, supplemented with streptomycin during the first 6 months were highly encouraging. Thus, as many as 76% of the patients had survived at the end of one year, a gratifying finding considering that over 80% of the patients belonged to stage II or stage III on admission.

## COR PULMONALE IN CHRONIC PULMONARY DISEASES

K.V. KRISHNASWAMI,\* K. SRINIVASAN,\*\* N. SIVARAJAN,\*\*\* and V. SUBRAMANIA RAM\*\*\*\*

**Summary:** The present study describes Cor Pulmonale in Chronic Pulmonary Diseases, it was observed in 5.62% of cases studied. The average duration of illness was 5.16 years. Electro-cardio-graph is found to be an important tool in early detection of Cor Pulmonale. Extent and nature of the pulmonary lesion contribute more to the development of Cor Pulmonale than duration of the illness. Prognosis of cases who develop Cor Pulmonale from Pulmonary Tuberculosis is relatively more adverse.

### Introduction

To denote involvement of the heart secondary to Pulmonary Disease, several nomenclatures have been suggested. The term Cor Pulmonale, first used by Dr. Paul White in 1931, has found universal acceptance. The catalogue of the other used include Emphysema Heart, Pulmonary Failure (Fulton 1953), Pulmonary Heart Failure (Stuart, Harris & Henley 1957), Chronic Pulmonary Hypertensive Heart Disease. Secondary Pulmonary Hypertensive Heart Disease, etc.,

In view of its infrequent recognition and poor prognosis once the right ventricular hypertrophy occurs, restricting the life expectancy thereafter to 4 years (Dr. Padmavathi et al 1966), this condition deserves greater attention and amelioration.

### Definition

Various definitions have been offered to describe Cor Pulmonale, which include presence of Pulmonary Hypertension (Fishman et al 1951), Hypertrophy of the right ventricle with or without congestive failure resulting from pulmonary parenchymatous or vascular disease (Friedberg, 1956) and the term being used only when congestive heart failure was present proposing the name Pulmonary Heart Failure (Stuart Harris & Henley, 1957).

Cor Pulmonale as defined by W.H.O. (1961) is the "hypertrophy of the right ventricle resulting from diseases affecting the function and/or the structure of the lung except when these pulmonary alterations are the result of diseases that primarily affect the left side of the heart or of congenital heart disease".

### Material & Methods

1475 cases admitted in the Tuberculosis and

Chest Disease wards in Government General Hospital, Madras from October 1978 to September 1979 were studied. These include cases of Pulmonary Tuberculosis requiring institutionalisation for complications etc., malignant of the lungs, suppurative pulmonary disease, emphysema and bronchial asthma

For each one of the study subjects, a proforma case sheet recording detailed clinical history, findings on clinical examination of the respiratory system and cardiovascular system was made out.

The criteria described by W.H.O. (1961) were taken as the basis for diagnosis. Essentially they were (I) presence of parasternal heave, epigastric pulsation or signs of overt right ventricular hypertrophy or failure, clinically; (2) evidence of pulmonary arterial hypertension and right ventricular enlargement, radiologically; and (3) Electrocardiographic indications of the presence of chronic cor pulmonale, viz. (1) right axis deviation, (ii) abnormal (tall, peaked) P wave in leads II, III and aVR indicative of strain of the right atrium, (iii) a tall R wave in leads aVF and VI, a small R wave and a deep S wave in the left pre-cardial leads, (iv) an isoelectric or negative T wave in lead I, a negative T wave in leads III and aVF, (v) negative T waves in the right pre-cardial leads, (vi) complete or incomplete right branch bundle block, (vii) low voltage in cases of emphysema, and (viii) downward deflection of the QRS complexes in the standard leads.

### Analysis

Among the 1475 cases investigated, 1089 were cases of Pulmonary Tuberculosis and 387 suffering from non-tuberculous pulmonary disease, of whom 63 (5.78%) and 20 (5.18%) respectively were cases of Cor Pulmonale.

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Table 1

*Pulmonary tuberculosis an non-tuberculous cases—age distribution*

Age (Yrs.)	P.T.			N.T.			Total		
	No.	C.P.		No.	C.P.		No.	C.P.	
		No.	%		No.	%		No.	%
15—34	423	23	5.43	1%	.1	1.52	619	26	4.20
35—44	256	13	5.07	61	2	3.27	317	15	4.73
45	410	27	6.58	129	15	11.52	539	42	7.79
Total	1089	63	5.78	386	20	5.18	1475	83	5.62

It is observed that among patients over 45 years of age a larger proportion of cases of Cor Pulmonale (7.79%) were detected. The corresponding figures in the same age group among Pulmonary Tuberculosis and Non-tuberculous cases are 6.28% and 11.62%.

Though in the overall, proportion of Cor Pulmonale among Pulmonary Tuberculosis cases is more, in the over 45 years age group, the proportion of Cor Pulmonale cases is significantly greater among the non-tuberculous cases ( $P < .01$ ).

**Table 2**  
*Cor Pulmonale—Diagnosis & Deaths*

Basis of Diagnosis	C.P. cases Detected		Known Deaths	
	No.	%	No.	%
Clinical, X-ray & ECG	13	15.66	6	46.15
Clinical & ECG	20	24.09	2*	10.00
Clinical & X-ray	2	2.40	—	—
ECG & X-ray	10	12.04	—	—
ECG	24	28.91	—	—
Clinical	14	16.86	2	14.28
Total	83	99.96	10	12.04

\*Note: There was one more death of Cor Pulmonale diagnosed on Clinical and ECG basis; but this death was due to profuse Haemoptysis,

Evaluating on the basis of the diagnosis (vide supra) of Cor Pulmonale among the 83 patients in this series, it is observed that 67 cases (80.72%) had shown definite ECG evidences whereas radiological evidence was present only among 25 (30%) cases and clinical evidence was found among 49 (50%) cases,

Among known deaths, the highest number is from those cases of Cor Pulmonale who showed clinical, radiological and ECG evidence, presumably due to the advanced stage of the condition with poor prognosis.

Out of 13 patients who satisfied all the parameters in diagnosing Cor Pulmonale, six of died (46.15%) seven cases who had irregular treatment gave a history of Tuberculosis of less than two years duration. The cause of death in one other case was haemoptysis. All the other ten cases had clinical signs of cardiac failure

Autopsy study could be conducted for three cases. The right ventricular wall showed hypertrophy and Tricuspid ring dilatation. One case showed caseous tuberculous endocarditis in the right ventricle (so far only about 6 cases reported in the world literature).

changes in the lung fields the significant leaning contributory in the development of Cor Pulmonale remain projected. More than one type of change in the lung fields was noticed in quite a number of these cases. Among the cardiovascular changes. Cardiomegaly and Tubular Heart were proportionately similar.

### Discussion

Pulmonary Tuberculosis has been considered to be an uncommon cause of Cor Pulmonale (Padmavathi and Pathak, 1959; Viswanathan, 1968; and Padmavathi & Mishra, 1969). Reports about post tuberculosis Cor Pulmonale were very rarely found in literature, in the pre-chemotherapy era (Viswanathan, 1967).

Wide variation in the incidence of Cor Pulmonale ranging from 5.5% to 47.1% (Samuelson, 1952; Viswanathan, 1968; Padmavathi & Mishra, 1969; Chattarjee et al 1971) may be attributable to selective nature of the study subjects and different diagnostic criteria.

In our series the incidence was 5.6%. The incidence in both Non-tuberculous chest conditions and Pulmonary tuberculosis cases was almost similar (5.78% and 5.18% respectively).

Table 3

*Cor Pulmonale—Causative Pulmonary Diseases*

Pulmonary Disease	Cor Pulmonale		Known Deaths	
	No.	%	No.	%
Pulmonary Tuberculosis	63	75.90	9*	14.28
Emphysema (Ch. Bronchitis/Bronchial asthma)	16	19.27	1	5.83
Infected cyclic lung	4	4.81	—	—
Total	83	99.98	10	12.04

Analysing the contributory pulmonary diseases, it is observed that in our study there were 63 cases of Pulmonary Tuberculosis (76%) and 20 with non-tuberculous Pulmonary Diseases (24%). There were 10 known deaths (12%) due to Cor Pulmonale and 9 of these were from cases of Pulmonary Tuberculosis who had developed Cor Pulmonale.

From the radiological findings reflecting the

32 cases of less than 15 years age were examined and none had cor pulmonale. The overall incidence in Government General Hospital with a bed strength of 1621 and about 55,000 admissions per year, varied from 0.2 to 0.3% which incidentally shows the importance of its awareness in clinical practice,

Though incidence of deaths due to tuberculosis has been appreciably reduced, the surviv-

Table 4

*Cor Pulmonale—X-ray Findings*

System	X-ray finding	No.	%
R.S.	Emphysema	73	87.95
	Fibrosis	86	79.51
	Infiltration :		
	Limited ..	16	
	Moderate ..	10	
	Extensive ..	38	64
	77.10		
Cavitation :			
	Limited ..	14	
	Moderate ..	7	
	Extensive ..	42	63
			75.90
C.V.S.	Cardiomegaly	21	25.30
	Tubular Heart	24	28.51
	Prominent MPA	14	16.80

Table 5

*Prevalence of Cor Pulmonale in pulmonary*

Author	No. Investigated	No. CP.	%
Padmavathi, and Pathak, 1959	127	7	5.5
Padmavathi, and Misra, 1969	454	32	7.0
Chatterjee <i>et al</i> , 1971	61	29	47.5
Agarwal <i>et al</i> , 1978	125	19	15.2
K.V. Krishnaswami <i>et al</i> 1979	1475	83	5.62

ing patients were left with chronic stable lesions with greater chance of development of cor pulmonale.

From a study of autopsies over a period of 11 years. Jenny & Cohen 1963 observed an increase of deaths from cor pulmonale from 4% in 1950 to 17% in 1960 although deaths from tuberculosis decreased from 74% in 1950 to 15% in 1960. Similar findings were reported by Lvinsky, 1968.

The average duration of illness before cor pulmonale set in was reported as over 10 years by Samuelson, 1952, below 5 years by Kapoor, 1959 and Padmavathi & Mishra, 1969 and average duration as 5 years by Agarwal *et al*, 1978. In the present study the duration of illness was between 5 and 6 years

Out of the 53 cases, 67 cases showed ( 80.72%) definite B.C.G. evidence whereas radiological evidence were present among 25 (30%) cases.

out of which 21 cases showed cardiac dilatation in P.A. views and clinical evidence was found among 49 (59%) cases. Out of 67 cases who had E.C.G. evidence, 9 died (13.43%); 7 fatal cases showed cardiac dilatation out of 25 (28%) and all the 10 fatal cases had clinical evidence (20.4%). 6 dead cases had all the three types of evidence (46.15%). So it could be seen that for the detection of cases of cor pulmonale HCG is a most valuable tool.

E.C.G. changes are probably the first finding to diagnose Cor Pulmonale early and the clinical evidence comes next and cardiac dilatation by radiography at a still later stage. Once all the three are evident the prognosis looks very poor. Out of the 10 deaths 7 cases gave a history of Tuberculosis with irregular treatment of less than 2 years duration,

Radiologically 73 cases showed emphysema (87.95%) 66 showed fibrosis (79.51%), 64 showed infiltration (77.10%) out of which 38 had extensive infiltration. 63 (75.90%) had cavitation out of which 42 had extensive cavitation. Hence it appears that the extent and nature of a lesion contributes more to the development of Cor Pulmonale than the duration of the illness.

On analysing the contributory pulmonary diseases it is observed that in our study out of the 10 known deaths 9 were cases of Pulmonary Tuberculosis who had developed Cor Pulmonale. It appears that the prognosis of cases who develop Cor Pulmonale from Pulmonary Tuberculosis is relatively more adverse.

### Acknowledgements

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## TIMING OF BCG VACCINATION IN INFANTS

S.K. DAS, K.D. GAUTAM, M.L. MEHROTRA, R.D. RAJAN AND J.P. SHARMA

**Summary:** A study on timing of BCG Vaccination in 1000 infants born at Lady Lyall and Dufferin Hospital, Agra was undertaken to find out suitable time for BCG Vaccination in infants. The infants were randomly allocated to one of the two groups;

- (i) BCG Vaccination at birth.
- (ii) BCG Vaccination at 3 months of age.

A 16 weeks' follow-up after BCG Vaccination reveals that BCG Vaccination can be given either at birth or at 3 months of age, but BCG Vaccination at 3 months of age is to be preferred because of higher post vaccination allergy, negligible complications, and suitability for application of vaccination through peripheral health workers.

### Introduction

Till the end of year 1977, direct BCG Vaccination was being given to new born infants within 7 days of birth under the TB Control Programme. According to the new policy, BCG Vaccination is now being advised for infants at the age of 3 months. With this change in policy we decided to undertake the present study to observe the variations due to BCG vaccination given at birth and at 3 months of age.

The present study was initiated in February 1978 and the results of 16 weeks' follow-up after initial vaccination in both the groups are being presented

### Method & Material

A total of 1,000 new born infants, at Lady Lyall and Dufferin Hospital, Agra, were taken into the study. The parents of these infants had to be permanent residents of Agra city. All the new born infants within the range of normalcy have been taken into the study, i.e. those infants who were under-weight or had congenital defect and or any pathological aberrations, were not eligible for intake.

The infants were randomly allocated to two groups, i.e. infants with odd serial number constituted group I and infants with even serial number constituted group II.

Infants in group I were given Direct BCG Vaccination on 3rd day of birth in the hospital and infants in group II were given Direct BCG Vaccination at the age of 12 weeks in their homes. The dose of Guindy, Madras freeze dried, freshly suspended, BCG vaccine was half the adult dose i.e. 0.05 ml., supposed to contain 0.2 million viable count.

Infants in both the groups were followed up at 16 weeks after direct BCG Vaccination. Size of BCG scar and complications of BCG Vaccination, if any, were recorded.

The infants, were given tuberculin test with 1 TU RT XXIII with tween 80, and the reactions were read by a consistent reader at 72 to 96 hours. The testing and reading job was performed by different technicians, and the card controlling was done by a third person, (The possibility of a consistent bias in the reading of reactions cannot be denied).

Out of 1,000 infants 786 could be assessed at 16 weeks after BCG Vaccination; 407 in group I and 379 in group II. 214 infants could not be covered due to various reasons — temporary absence from house, migration, mortality, other sickness, and refusal but every effort was made to re-visit and examine them within the next four weeks.

### Results

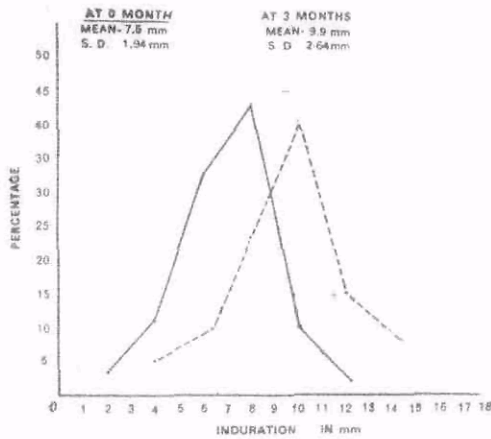
#### *Distribution of Size of Tuberculin Reaction*

First curve in Fig. 1 shows the distribution of tuberculin reaction at 16 weeks among infants given direct BCG Vaccination at birth. This is an uni-modal distribution, indicating that all the infants can be treated as tuberculin positive—i.e. Direct BCG Vaccination can be considered to have produced tuberculin allergy in all the infants.

Second curve in Fig. 1 shows the distribution of size of tuberculin reaction at 16 weeks among infants given direct BCG Vaccination at the age of 3 months. This is also an unimodal distribution indicating that all the infants can be treated as tuberculin positive i.e. Direct BCG Vaccination

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### SIZE OF TUBERCULIN REACTION AT 16 WEEKS AFTER DIRECT 8CG VACCINATION



can be considered to have produced tuberculin allergy in all the infants.

#### Comparison of size of Tuberculin Reaction

Mean size of tuberculin reaction in infants vaccinated at birth is 7.5 mm and mean size of tuberculin reaction in infants vaccinated at 3 months of age is 9.9 mm. The difference between the mean sizes of tuberculin reactions is highly significant ( $P < .01$ ). This indicates that Direct BCG Vaccination at 3 months of age produces a significantly higher tuberculin reaction as compared to direct BCG Vaccination at birth,

#### Distribution of Size of BCG Scar

First curve in Fig. 2 shows the distribution of size of BCG Scar at 16 weeks among infants given vaccination at birth. This is an unimodal distribution with a mean size of scar of 4.2 mm.

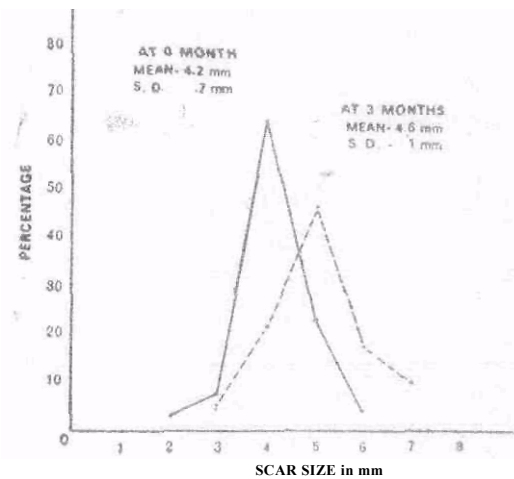
Second curve in Fig. 2 shows the distribution of BCG Scar at 16 weeks after vaccination among infants vaccinated at the age of 3 months. This is also an unimodal distribution with a mean size of scar of 4.6 mm. The difference between the mean sizes of BCG scar is significant ( $P < .01$ ). This indicates that direct BCG Vaccination has produced significantly big size scar among infants vaccinated at the age of 3 months as compared to infants vaccinated at birth.

#### Complications

Out of 407 infants vaccinated at birth only four infants i.e. one percent had complications. These infants developed axillary glands. In three cases, the axillary glands subsided spontaneously

within eight weeks and in the fourth case the gland enlarged up to 39 mm. became soft and had to be aspirated once and followed up with sulpha drug orally for five days.

### SIZE OF BCG SCAR AT 16 WEEKS AFTER DIRECT BCG VACCINATION



Out of 379 infants vaccinated at 3 months of age only one infant developed axillary gland, though comparatively of small size which subsided spontaneously.

#### Discussion

About ninety five per cent of bacteriologically confirmed cases of pulmonary tuberculosis show a positive tuberculin reaction when tested with 1TU RT XXIII tween 80.<sup>1</sup>

The new born infants are free from any tubercular infection and infection due soother mycobacteria. Once these infants have been given BCG vaccination, a suitable definition of tuberculin reaction should characterize hundred per cent of the vaccinated infants as positive provided the BCG vaccine is potent and given with due care.

In the present study 55 (13.5%) out of 407 infants vaccinated at birth had 5 mm. or less reaction to 1 TU RT XXIII at 16 weeks after vaccination while 18 (4.7%) out of 379 infants vaccinated at the age of 3 months had 5mm. or less reaction to 1 TU RT XXIII at 16 weeks after vaccinations.

In this study, we have considered a size of

Table I

*Size of MX. reaction at 16 weeks after direct BCG Vaccination*

Size of Reaction (mm)	Number of Infants			
	At birth		At 12 weeks	
0-5	55	13.5%	18	4.7%
6	352	86.5%	361	
Total	407		379	

Table II

*Complications after direct BCG Vaccination*

Complications	At Birth		At 12 weeks	
	Total infants	No. with complications	Total infants	No. with complications
Axillary Glands	407	4(1%)	379	1(0.3%)

more than 5mm. of reaction as positive, because of the following reasons :

1. BCG induced allergy, on testing with human type of PPD RT XXIII (heterologous nature of tuberculin) elicits softer and smaller reactions with indistinct margin.<sup>2</sup>

2. Since we have been using F.D. vaccine, the level of allergy induced by F.D. vaccine is significantly lower than the liquid vaccine.

3. Intradermal control test with buffer solution gives a reaction upto 5 mm.<sup>2</sup>

Even though the onset of BCG induced allergy among new born infants is delayed, and also of a lower level, as mean size of tuberculin allergy is 7.5 mm. in new born infants, as compared to the mean size of 9.9 mm. in infants aged 3 months, it does not mean that protective affect is also low or impaired.

### Conclusions

I. Tuberculin conversion at sixteen weeks after vaccination with .05 ml. of fresh standard suspension of F.D. BCG Vaccine is similar in both groups of new born and 3 months old infants.

2. BCG Vaccination at birth, as revealed by the study, produces comparatively low level of tuberculin allergy than BCG Vaccination at 3 months of age.

3. Enlargement of axillary glands, as a complication of BCG Vaccination was observed in 1% of infants vaccinated at the age of 3 months.

4. BCG Vaccination can be given both at 0 month and 3 months of age, but if C.H.W. or M.P.Ws. have to give BCG Vaccination in rural areas. BCG vaccination at 3 months may be preferred because of negligible complications and for achieving higher degree of post-vaccination tuberculo allergy.

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# SKIN TEST REACTIVITY TO LOCAL ALLERGENS IN BRONCHIAL ASTHMA

K.V. RAMANA RAO,\* M.A. RAHIM,\*\* S.C. JENA and H.DAS\*\*\*\*

**Summary** : 50 patients of Bronchial Asthma were skin tested with fifty allergens of local importance. 90% cases gave positive results, pollen being the most common offender followed by fungi and dusts. Amongst the dusts House Dust accounted for more than half of positive tests. In insects sex specific antigens were noted with respect to cockroaches. Skin tests were invariably positive in younger ages and in those with onset of Asthma dating back to childhood. Prausnitz Kustner test and Bronchial Sensitivity Test showed good corroboration with positive skin tests when considered patient wise. Pollen and dust in younger ages and pollen and fungi in older ages were the more common offender. Where attacks were irregular or perennial more than one allergen was responsible for the attacks. Intrinsic asthmatics had more a seasonal pattern of attacks and no perennial pattern was noted.

## Introduction

Multiple factors like allergy, infection, emotion and exercise are responsible for triggering the attack of bronchial asthma. Of these allergy has created a considerable field of interest. In different places efforts are being made for precise localisation of the causative allergens and also to evaluate the curative value of treatment by Immunotherapy. Stevenson et al (1975) found allergy as attributable cause in 45%; and William et al (1958) in 88% cases. Pollens, fungi, dusts, insects and a host of different agents come under the category of allergenic agents. Their extracts are used in specified concentration for intra-dermal skin testing and susceptible individuals show a positive skin reaction.

## Materials and Methods

50 cases of Bronchial Asthma who are on record in Allergy clinic of S.C.B. Medical College, Cuttack were taken up for the study. Allergens of local importance were selected in consultation with a Senior Botanist. 50 Allergens (12 Pollens; 17 fungi; 4 dusts; 7 insects; 4 danders; 2 feathers and 4 miscellaneous agents) were injected intradermally and results compared with control of buffered saline. To ensure reactivity status of skin. Histamine was also injected intra-dermally.

Prausnitz-Kustner (P-K) test was done to confirm positive skin test. Healthy volunteers were injected with patients' serum and 48 hours later skin tests with allergens giving positive result in the patients were carried on the spots where serum was injected. Interpretation, of both above tests was done in accordance with criteria laid down by Shivpuri (1962).

For incriminating the allergen concerned as the provocative agent on the target organ Bronchial Sensitivity Test (B.S.T.) was done by making patient breath a nebulized spray of the antigen. Change in airway resistance unmeasured b) undertaking lung, function tests.

Table 1

*Case detection by skin tests*

Types of Asthma	Males	Females	Total
Extrinsic Asthma	35	10	45
Intrinsic Asthma		3	5
Total	37	13	50

In above series 37 were males and 13 females. On basis of skin tests 45 (males-11) came out Extrinsic and 5 (female-3) as Intrinsic. Female were more in Intrinsic group.

Above table reveals that all patients below 30 years of age were skin test positive with 15 out of 21 (714%) reacting to 3 or more allergens.

Out of the 12 pollens adhatoda; azadirachta; cassia occidentalis; ricinus communis and typha angusta came out as major offenders.

Of the 17 fungi tested, Candida; asp. tamariri; acrothecium and cladosporium gave more positive results.

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Table 2

*Skin test results*

Age in years	No response	+ve to Allergen	+ve to 2 Allergens	+ve to 3 or more allergens	Total
10—19	0	1 (16.7%)	0	5 (83.3%)	6 (12%)
20—29	0	0	5 (33.3%)	10 (66.7%)	15 (30%)
30—49	5 (21.5%)	2 (8.7%)	5 (21.7%)	11 (47.9%)	23 (46%)
50—59	0	2 (50%)	0	2 (50%)	4 (8%)
60 & above	0	0	1 (50%)	1 (50%)	2 (4%)
Total	5 (10%)	5 (10%)	11 (22%)	29 (58%)	50 (100%)

Table 3

*Skin test results with each pollen*

Pollen	Number	Percentage	Pollen	Number	Percentage
Adhatoda	11	(26.9)	Chenopodium album	1	(1.9)
Albizia	3	(5.8)	Melia azadirachta	2	(3.9)
Argemone	3	(5.8)	Ricinus Communis	5	(9.6)
Azadirachta	8	(15.3)	Typha angusta Xanthium	5	(9.6)
Brassica	1	(1.9)	Strumarium	3	(5.8)
Cassia Occidentalis	5	(9.6)	Zea mays	2	(3.9)
Total test + ve 52					

Amongst the diseases house dust accounted for more than half of +ve results. Next in order was cotton dust.

Of the six insects cockroaches as responsible agents were seen in about 50% with female cockroaches yielding more positive results than the male ones. Next in order were house fly and butterfly.

Among miscellaneous agent, Amaranth us accounted for about 2/3rd +ve tests. Feathers and danders yielded only 3 positive tests each.

In above close corroboration is seen bet-

ween +ve skin and P.K., test. It is not so with bronchial sensitivity test.

Tabulating the results patient-wise we find close corroboration between all 3 tests as seen in the above table.

Above table reveals that younger the age of onset of asthma, more is the skin test reactivity to multiple allergens.

Overall results of table 10 tabulated together in above shows that younger patients give more positive results and that too with respect to 3 or more allergens.

**Table 4**

*Skin test results with each fungi*

Fungus	Number	Percentage	Fungus	Number	Percentage
Acrothecium	4	(10.3)	Fusarium solanii	0	
Alternaria	2	(5.1)	Helminthosporium	3	(7.7)
Aspergillus flavus	3	(7.7)	Mucor	1	
	2	(5.1)	Neurospora	0	
Aspergillus Niger			Phoma hybernica	3	(7.7)
Aspergillus Fumigatus	2	(5.1)	Rhizopus	1	(2.6)
Aspergillus Tamarii	5	(12.6)	Trichodenna	2	(5.1)
Aspergillus versicolor	1	(2.6)	Candida	5	(12.8)
Cladosporium	4	(10.3)			
Curvularia	1	(2.6)			
Total test	vc39				

Table 5

*Skin test results with each dust*

Dust	Number	Percentage
Cotton dust	9	(26.4)
House dust	19	(55.9)
Paper dust	2	(5.9)
Wheat dust	4	(11.8)
Total	34	(100%)

Table 6

*Skin test results with each insect*

Insect	Number	Percentage
Ant	1	(3)
Butterfly	5	(14.7)
Cockroach malt-	7	(20.6)
Cockroach female	9	(26.4)
House fly	9	(26.4)
Mosquito	1	(3)
Rice weevil	2	(5.9)
Total	34	(100%)

Age-wise sensitivity reveals that pollen and dust are common offenders in younger ages and fungi and dusts in older ages.

Of the 45 cases of Allergic Asthma, singular

allergens was responsible in 8 cases. In rest more than one allergen was the cause, pollen being the most common accompaniment.

In B.S.T. +ve cases of Asthma pollen follow-

ed by fungi, dust and insects were responsible agents in that order of frequency. In 14 more than one allergen was responsible, pollen being the common associate.

Table 7

*Skin test results with miscellaneous agents/faethers/danders*

Allergen	Number	Percentage	Total
Gum acacia	2	14.3	14(100%)
Wool	2	14.3	
Amaranthus spinosus	9	64.3	
Sorghum	1	7.1	
Chicken feather	2	66.7	3(100%)
Pigeon feather	1	33.3	
Buffalo dander	0		
Cow dander	2	33.3	
Horse dander	2	66.7	
Dog dander	0		

in 5 inspire of careful selection of allergens. Daley & MilLr. (1971) opine that Intrinsic asthma is thought to be a lens expressing inability to isolate an allergen.

In younger ages skin tests were invariably + ve suggesting that childhood asthma is usually allergic (Pepys, 1967).

On basis of skin tests with different pollens Adhiitoda, A/adirechla, Cassia occidentalis, Ricinus communis and Typha angusta yielded more positive result<sup>1</sup>. These are different from other authors reports suggesting discrepancy in distribution of pollen from place to place.

Of the fungi Candida, Aspergillus tamarii, Acrothecium and Cladosporium were more significant. Agarwal et al (1974) also found similar results showing widespread distribution of above fungi. Of the dusts, house dust was found most important of all. Other workers report similar results. Allergenicity of house

Table 8

*Results of P.K- test and B.S.T.*

Allergen	Total tests	P.K. ve	B.S.T ve
Pollen	52 (29%)	42 (80.8%)	15 (28.9%)
Fungi	39 (21.8%)	31 (79.5%)	8 (20.5%)
Dust	34 (19%)	28 (32.4%)	12 (35.3%)
Insects	34 (19%)	26 (76.3%)	10 (29.4%)
Feathers & danders	6 (3.4%)	5 (83.3%)	0
Misc. agents	14 (7.8%)	12 (85.7%)	2 (14.3%)
<b>Total</b>	<b>179 (100%)</b>	<b>144 (80.4%)</b>	<b>47 (26.3%)</b>

Above table points that perennial asthmatics had some extrinsic factor responsible for their attacks where multiple allergens were responsible, majority had irregular type of attacks.

**Discussion**

Of the 37 males and 13 females, skin tests were +ve in 35 and 10 respectively. They were negative

dust is due to mites, most common being Dermatophagoides pteronyssinus.

Among insects cockroaches gave maximum positive results. Positive results were more in female than in male Cockroaches. Sex specific antigens are said to exist in insects (Shalish et al, 1969).

As regards other antigens used feathers and

Table 9

*Patient-wise results of P.K. Test and B.S.T.*

Allergen	Total patients +ve	P.K. +ve	B.S.T. +ve
Pollen	31 (68.9%)	27 (87.1%)	14 (45.2%)
Fungi	26 (57.8%)	22 (84.6%)	7 (26.9%)
Dusts	32 (71.1%)	26 (81.3%)	13 (40.6%)
Insects	25 (55.6%)	21 (84.0%)	9 (36.0%)
Feathers & danders	6 (13.3%)	5 (83.3%)	0 (0.0%)
Misc. agents	11 (24.4%)	8 (81.1%)	2 (18.2%)
Total	45 (100.0%)	93 (3%)	30 (64.4%)

Table 10

*Skin test results with relation to age of onset of asthma*

Age group in years.	No response	+ve to allergen	+ve to 2 allergen	+ve to 3 or more allergens	Total
0—9	0	1	1	4	6(12%)
10—19	1	1	3	10	15 (30%)
20—39	3	2	5	12	22 (44%)
40 & above	1	1	2	3	7 (14%)
Total	5 (10%)	5 (10%)	11 (22%)	29(58%)	60(100%)

Table 11

*Overall positivity with relation to age of onset*

Age group in years.	+ve to more than 1 allergen	+ve to more than 3 allergens,
0-9	100.0%	66.6%
10-19	93.3%	66.6%
20-39	86.3%	54.5%
40 and above	85.7%	42.8%

Feathers & danders gave insignificant results and no conclusion can be drawn from them.

Correlation between skin and P-K test is very good when considered with regard to total +ve tests and patient-wise. Though P-K test is very valuable aid, there is the risk of transmission of serum hepatitis. Monkey ileum sensitisation test is as sensitive and specific as P-K test (Shal el al, 1973). As regards skin test and B.S.T. correlation is uniform when considered patient wise but not so when considered with regards to total positive test. This may be due to differing sensitivity of the target organ and the antigen used for B.S.T. is a purified extract and not in

SKIN TEST REACTIVITY TO LOCAL ALLERGENS IN BRONCHIAL ASTHMA

Table 12  
Age-wise Sensitivity Pattern

Age in years	Total cases	Pollen	Fungi	Dusts	Inserts
10—19	6	5 (83.3%)	2 (33.3%)	4 (66.7%)	2 (33.3%)
20—29	15	12 (80%)	9 (60%)	12 (80%)	9 (60%)
30—49	23	14 (60.9%)	9 (39.6%)	11 (47.8%)	11 (47.8%)
50-59	4	0 (0%)	4 (100%)	2 (50%)	2 (50%)
60 & above	2	1 (50%)	2 (100%)	2 (100%)	2 (100%)

Table 13

Table 14

Skin test results in 45 cases of allergic asthma

Skin test result in B.S.T. +ve cases of asthma

Allergen	+ve cases	Allergen	+ve cases	Percentage
Pollen (P) only	4 (8.9%)	Pollen (P) only	8	27.6
Fungus (F) only	3 (6.7%)	Fungi (F) only	4	13.8
Dust (D) only	1 (2.2%)	Dust (D) only	3	10.4
Insect (I) only	0	Insect (I) only	1	3.4
P+F/P+D/I + D	3 each (6.7%)	I+D	5	17.3
P+I/F+D/F+D+T	1 each (2.2%)	P+F/P+I/P+D	2 each	6.9 each
<b>P+F+D</b>	4 (8.9%)	P+D	1	3.4
P+I+D	5 (11.1%)	P+I+D	1	3.4
P+I+F+D	7 (15.5%)	Total	29	(100%)
More than 4 groups	4 (8.9%)	can not be done in one sitting with one allergen elicits a positive response.		
Total	45 (100%)	In asthmatics with onset in younger ages skin tests were invariably -4-ve. further con fir-mini:		

the crude, natural form. B.S T. is a valuable diagnostic aid but is time consuming, carrying risks of acute attacks of bronchial asthma

## SIGNIFICANCE OF LEPROMIN TEST — A REAPPRAISAL\*

K. V. DESIKAN

**Summary** : The lepromin test was first described by Mitsuda in 1919. The preparation of the antigen has since been modified by different workers and the test has been extensively applied for clinico-immunological assessments. Two types of antigens are in use—Mitsuda and Dharmendra lepromins which are described. Dharmendra lepromin is being studied in depth at the Central JALMA Institute for Leprosy, Agra, It has been standardized carefully and the standard lepromin has been found to give consistent results.

The response of the skin test in leprosy patients helps in determining the position of a case in the wide immunological spectrum of the disease. Observation on healthy contacts showed that lepromin positivity increased with age, most of the close contacts becoming positive to the test after 30 years of age. Lepromin positivity is also associated with a higher immunity and better protection against leprosy particularly against development of lepromatous leprosy.

A close correlation has been found between tuberculin and lepromin positivity indicating a cross immunity between the two disease. This has naturally resulted in efforts to produce immunity against leprosy by B.C.G. vaccination. The conversion of lepromin negativity to positivity by B.C.G. has led to extensive investigations to find out the protective value of B.C.G. Results have been equivocal as they have been found to be highly divergent in 3 large scale trials conducted in Uganda, New Guinea and Burma. While B.C.G. vaccination gave effective protection against leprosy in Uganda, the W.H.O. trials in Burma showed B.C.G. vaccination to be ineffective. It was therefore hypothesized that other factors might influence the protective efficacy of B.C.G. The data available on this work indicate that *M. vaccae* and *M. non-chromogeoicum* stimulate the action of B.C.G. while *M. mariamin* has an opposite effect of depressing it.

The Lepromin test could be compared to the Tuberculin test since it is also a skin test intended to assess the delayed types of hyper sensitivity (DTH) due to a specific infection. However, there are certain basic differences in the nature of antigen between Tuberculin and Lepromin. Tuberculin is a culture filtrate of tubercle bacilli. Since leprosy bacilli cannot be cultured, lepromin is a suspension of whole or partially defatted leprosy bacilli killed generally by heat. Secondly, since the only source of leprosy bacilli is the human or armadillo host, contamination by the host tissue is unavoidable despite all the attempts to purify the organisms from the tissue contamination.

Lepromin was first described by Mitsuda in 1919 and later developed by Mitsuda and Hayashi in 1933. Subsequently, several methods have been used to prepare lepromin.

The original Mitsuda antigen — the crude or integral lepromin — is prepared by grinding the tissues rich in bacilli in 0.5% carbol saline, the larger particles being removed by filtration. The lepromin is standardized by the weight of the whole tissue. It is obvious that lepromin prepared by this method would contain a considerable proportion of human tissues, Fernandez and Castro purified the integral lepromin by differen-

tial centrifugation, but the yield of bacilli by this method was not high.

The lepromin extensively used in India is the one prepared according to the method described by Dharmendra (1967) in which the organisms are extracted from the tissues with chloroform. The lepromin thus prepared is comparatively free of host tissues, but the bacilli are partially defatted on account of the chloroform used. The standardization of Dharmendra lepromin is also by weight, 10 mg of dried bacillary powder being dissolved in 100 ml carbol saline.

### *Method of Testing and Reading*

0.1 ml of lepromin is injected intradermally usually on the fore-arm. Positive reaction is observed at two different times—48 hours and 21 days after the injection. The 48 hour reaction or the early reaction is seen as a wheal with slight edema and induration. The diameter of the wheal and induration is measured by a pair of calipers. The reaction is a manifestation of the classical delayed type hypersensitivity and is weak with Mitsuda lepromin.

The 21 day reaction or the late reaction is seen as a local induration of skin producing a nodule like firm swelling. In a strong reaction

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the nodule often ulcerates. The diameter of the induration is measured. The reaction is strong with Mitsuda lepromin but weak with Dharmendra preparation. On histological examination, the nodule shows collections of numerous lymphocytes with epithelioid cells and occasionally giant cells. The picture corresponds to that of tuberculoid type of leprosy.

#### Standardization of lepromin

It is seen that both Mitsuda and Dharmendra lepromins are standardized by weight—the entire tissue being weighed in the former, and bacillary powder in the latter.

At the Central JALMA Institute for Leprosy, Agra where Dharmendra antigen is used (Sengupta et al 1978), it was found that lepromin prepared at different occasions gave varying results in similar patients. To verify this, the different batches of lepromin were injected simultaneously to the same patient. The readings at 24 hours and 3 weeks showed a wide variation in the response to different batches. The next step was to find the possible reason for this inconsistency. It was thought that the concentration of bacilli may be different and therefore a

count was made of the bacilli in each batch. The counts showed that the number of bacilli per ml of the suspension varied from 0.08 to 8.8 millions.

The antigen with the highest concentration of bacilli gave the strongest reaction. It was therefore planned to study the antigen at different concentrations. The WHO recommended concentration for Mitsuda antigen was first prepared with 160 million bacilli per ml and it was serially diluted. The different dilutions of lepromin were again tested in the same patient. The following table gives the findings:

It could be considered that lepromin with a concentration between 16 and 1.6 million might give a dependable and consistent result. Therefore a concentration of 10 million bacilli per ml was arbitrarily fixed. Lepromin prepared with this concentration gave the results consistently.

It was gratifying to find that Dharmendra antigen prepared with 1/16 the concentration recommended by W.H.O. gave good results. This was a great advantage since we can get 16 times the volume of lepromin from the human tissues which is very difficult to obtain.

Table 1

*Lepromin Reaction in Tuberculoid leprosy patients (TT) with different dilutions of Dharmendra antigen*

SI. No.	Registration No.	Age and Sex	A		B		C		D		E		F	
			24 hr	3W*	24 hr	3W*	24 hr	3W*	24 hr	3W*	24 hr	3W*	24 hr	3W*
1.	10074	35M	21/7	10	13/6	7	10/3	0	0	0	0	0	9/3	3
2.	9945	37M	21/9	u**	16/5	10	12/5	7	7/3	0	0	0	10/4	7
3.	2775	27M	20/3	3	14/4	1	5/2	0	0	0	0	0	4/2	1
4.	5572	50M	15/3	4	10/3	3	5/2	0	0	0	0	0	0	1
5.	10112	20F	20/4	U	12/3	6	0	0	0	0	5/2	2	8/2	3
6.	10117	45F	22/5	U	14/4	5	4/2	4	0	3	0	0	11/3	3
7.	7451	35M	18/3	U	10/3	5	0	3	0	0	0	0	10/3	2
8.	10208	35M	30/5	U	18/5	10	0	5	0	3	0	2	20/4	4

\* Late reaction in mm. at 3 weeks; \*\* U = Ulcer

Note : (1) The bacillary concentrations in antigen A to F in this table as well as tables 4, 5 and 6 are as follows :  
A = a 160 million, B = 16 million, C = 1.6 million, D = 0.16 million, E = 0.016 million and F = 0.95 million bacilli/ml.

(2) Numerator is the diameter of erythema in mm and denominator is the diameter of induration in mm.

Table 2

*Lepromin reaction in mm with Standardized Dharmendra antigen*

Patient	Type	A		B		C	
		24H	3W	24H	3W	24H	3W
11002	BT	15	3	15	3	11	3
11156	TT	22	NR	22	NR	24	NR
10759	TT	27	U	28	U	26	U
10445	BT	20	3	19	3	20	3
10960	BT	17	3	19	3	18	3
10656	TT	20	U	19	U	20	U
10340	TT	22	3	22	3	25	3
11014	TT	17	U	19	U	18	U

ABC = 1 Ox 10<sup>6</sup>AFB/ml from different sources

U = Ulcer

NR = Not Read

**Lepromin reaction in cases of leprosy**

The positivity of Lepromin test runs parallel with the Cell Mediated Immunity. Therefore, it is strongly positive in cases of Tuberculoid leprosy and negative in lepromatous leprosy. On the Borderline and Intermediate types it has an intermediate response, and various according to the C.M.I.

The present concept of leprosy is that of an immunological spectrum—spreading from highly resistant Tuberculoid (TT) through the Borderline group to the practically non-resistant Lepromatous (LL). The Borderline group can further be divided into 3 types — the Borderline towards the Tuberculoid (BT), the truly Borderline (BB) and the Borderline towards the Lepromatous (BL).

The above 5 groups in addition to a larger number of intermediate forms, show gradual gradation in the resistance from the Tuberculoid to the Lepromatous end. The lepromin test shows a corresponding fall from the strongest reaction in Tuberculoid leprosy to the Negative response in lepromatous leprosy with variable degrees of positivity in the different types of

Borderline cases. It is obvious from the results of the lepromin test that the Tuberculoid (TT) type shows the highest host resistance, while the lepromatous type is “anergic” to the skin test and the Borderline group show varying degrees of positivity depending on their position in the immunological spectrum. Other parameters have been used to assess the CMI like the LTT and LMI test. These tests further confirm the gradual decline in CMI across the spectrum including the “anergic” state of lepromatous leprosy.

The anergic state of lepromatous leprosy is the most interesting phenomenon in leprosy which is not seen in other diseases. In tuberculosis at any rate, there is no condition parallel to lepromatous leprosy. There is thus perhaps an immune paralysis in lepromatous leprosy which accounts for the extremely large number of bacilli much greater than the number of bacilli found in the tissues of even moribund cases of tuberculosis. Thus the anergy in lepromatous leprosy seems to be a distinctive feature. As such, if skin testing is used to find out antigenic similarity of an organism with *M. leprae*, it would be equally or more important to consider skin test negativity in lepromatous leprosy in addition to positive response in tuberculoid cases.

### Significance of Lepromin test in cases of Leprosy

The most important significance of lepromin test is in its application in classification of the disease. While in a good number of cases, diagnosis is possible by clinical examination alone, a proper classification of the disease requires clinical and histological examination, assessment of bacterial load by skin smears, as well as by lepromin reaction. The lepromin reaction in different types of leprosy is indicated below:

Tuberculoid type (TT)	..	2+ to 3+
Maculo anaesthetic type (MA)	..	1+ to 2+
Indeterminate type (I)	..	Neg. ± or +
Borderline type (BT)	..	1+ to 2+
		(BB)
	..	± or +
		(BL)
	..	Neg. or ±
Lepromatous type (LL)	..	Neg.

It is obvious that Lepromin cannot be used as a diagnostic test since the very malignant form of the disease, namely the lepromatous type as well as some of the intermediate groups are negative. Even positive test has no significance since the test indicates a delayed hypersensitivity reaction to an exposure to *M. leprae*. As such it could be expected to be positive in a good proportion of persons living in endemic areas and also in contacts of leprosy patients who might have a sub-clinical infection without manifestation of the disease.

While it is not a diagnostic test, lepromin helps in assessing the prognosis of a case. Thus, a patient of the Indeterminate type of leprosy with negative lepromin test has a grave prognosis

since it is likely to turn into the lepromatous variety. Similarly a patient with 2+ lepromin test belonging to the Maculo-anaesthetic type or Borderline (BT) type has a favourable prognosis.

### Significance of lepromin test in contacts and healthy people in endemic areas

Contacts of leprosy patients as well as healthy people in endemic areas, are constantly exposed to the infection. Since Indians as a race have the innate ability to mount a good immunity against leprosy infection, a large majority of them exhibit a positive lepromin response. In a study on the contacts of leprosy patients, it has been observed by Dharmendra that the lepromin positivity increases with age and by about 30 years most of the contacts show a positive response.

It is important to consider whether this positive lepromin reaction has any protective value against leprosy. A very outstanding study in this regard has been done by Dharmendra and Chatterjee (1955). In the Bankura district of West Bengal, 803 healthy persons were lepromin tested. 15-20 years after this testing, 680 persons were retested and were examined for leprosy. The findings are given in the following table:

Among the 680 persons found and examined, 39 had developed leprosy (5.7%). From among the persons who were originally lepromin negative, 14% developed leprosy as against 3.2% among the lepromin positive group. Further, the lepromin negative individuals developed mostly the lepromatous type (15 out of 23) while not a single case of lepromatous leprosy occurred in the lepromin positive individuals. These

Table 3

15-20 year follow up of Lepromin tested population  
(Dharmendra and Chatterjee 1955)

Result of the Lepromin test	No. of	Cases of Leprosy		
		L	N	Total
Negative	156	15 (9.6%)	7 (4.5%)	22 (14.1%)
Positive				
Weak	163	0	9	9 (5.5%)
Moderate	125	0	3	3 (2.4%)
Strong	236	0	5	5 (2.1%)
Total	524	0	17	17 (3.2%)
Total	680	15 (2.2%)	24 (3.5%)	39 (5.7%)

results indicate that lepromin positivity is associated with higher immunity and better protection against leprosy, particularly against lepromatous leprosy.

#### Relation of Lepromin to Tuberculin

Many studies have been undertaken to see if there is any correlation between lepromin and tuberculin. Extensive work has been carried out by several workers on the healthy population in districts where both leprosy and tuberculosis are known to be prevalent. Observations of different authors have been compared by Guinto et al (1955). It was obvious that there was a good correlation between tuberculin and lepromin reactions, which indicates the possibility of a cross reaction. However, there is also disagreement between positive tuberculin and lepromin in both directions. Assuming that the two skin reactions resulted in cross sensitization between common antigens of the two organisms, the discrepancies could be explained by the possibility that in some persons, the two responses are dissociated.

#### Effect of BCG vaccination on Lepromin reaction

It was first reported by Fernandez in 1939 that vaccination of lepromin negative children with BCG converted them to lepromin positivity. Subsequently several workers have confirmed this finding. A methodical study was conducted by Doull (1957) in Phillipines, in which he was able to exclude the possible role of repeated lepromin testing in such a conversion of lepromin by BCG. Since lepromin positivity indicates a

host resistance in leprosy, the obvious corollary was to find whether BCG vaccination could protect against leprosy. Kinear Browne and Stone (1963) found an effective protection in his trials in Uganda. However, a very well-planned and extensive work by WHO in Burma did not confirm such an effective protection by BCG. The subject therefore remains much of a controversy now.

#### Effect of environmental Mycobacteria on the protection against leprosy

The contradictory results of BCG vaccination in Uganda and Burma have lead to the study of other factors that influence the protective value of BCG. The role of environmental mycobacteria was a possible factor. Stanford et al (1973), studied the occurrence of different mycobacteria in different areas of Uganda by investigating the soil samples as well as by skin testing the population with antigens of a variety of Mycobacteria (both slow growing as well as fast growing). Three different areas in Uganda were studied and the results are given below:

The conclusion that could be drawn from the above tables is that a high prevalence of slow growers in Kyoga gave a protection against Tuberculosis which is only moderate compared to the other two areas. Also, a combination of high incidence of fast growers and high incidence of tuberculosis in Kampala gave a protection against leprosy as contrasted with Toro where there is high incidence of tuberculosis but low incidence of fast growers. It was concluded that

Table 4

#### *BCG vaccination and leprosy incidence*

Place	Group	Total No. of children	Leprosy Cases		%
			No.	Rate/ 1000	
Uganda	Un vaccinated	9036	174	19.3	
	BCG Vaccinated	9053	27	3.0	84
	Un vaccinated	13780	264	19.2	
Burma	BCG Vaccinated	13797	224	16.2	16
	Un vaccinated	2295	18	7.8	
Karimui	BCG Vaccinated	2318	8	3.4	56

Table 5

*Epidemiological comparison among areas of Uganda*  
(Stanford and Paul 1973)

	Toro	Kampala	Kyoga
Tuberculin % Positive	61	64	90
Average % Positive to Slow Growers (Av, A*, Go)@	38	33	68
Average % Positive to Fast Growers (D, C, No L, V, Ne)@	15	32	40
Prevalence of leprosy (per 1000)	26	11	23
Incidence of Tuberculosis	High	High	Moderate
@ See table 7.			

in an area like Kyoga where there is a high incidence of fast growers, introduction of BCG would produce good protection against leprosy. This was actually found to be true since there was 85% protection in Kyoga with BCG.

The next step was to see which of the fast growing Mycobacteria influenced the effect of BCG vaccination. The results of another study by Paul et al (1975) in East Africa are given in Table 6,

Table 6

*Response to antigens from different Mycobacteria*  
(figures % positive — Paul et al 1975)

	Leprosy Patients (BL & LL)	Leprosy Patients (BT & TT)	Close Contacts of Leprosy Patients	Non-Contacts
M. tuberculin	68	73	91	96
M. avium	48	38	54	60
M. Sp. A	45	37	71	76
M. gordonae	17	35	52	65
M. nonchromogenicum	5	19	35	15
M. lactin	6	25	48	24
M. vaccae	10	21	27	16
M. fortuitum	9	17	25	35
M. duvalin	13	18	22	47
M. chelonae	91	67	69	76

It can be seen that 3 organisms seem to produce a response somewhat similar to *M. leprae*. They are *M. non-chromogenicum*, *M. non-chromogenicum lactis* and *M. vaccae*. A greater percentage of contacts produced positive response than non-contacts and also there was suppression of response in the LL/BL cases. They might possibly help in stimulating the effect of BCG vaccination. It was found that these very organisms were highly prevalent in Kyoga as seen in the following table.

Table 7

Percentage positive skin test antigens of different *Mycobacteria* in 3 regions of Uganda (Stanford and Paul, 1973)

	Toro	Kampala	Kyoga
<i>M. tuberculin</i> (T)	61	64	90
<i>M. Avium</i> (Av)	20	10	57
<i>M. Sp. A</i> (A*)	58	61	87
<i>M. gordonae</i> (Go)	37	27	60
<i>M. fortuitum</i> (F)	5	30	31
<i>M. duvalii</i> (D)	25	21	40
<i>M. chelonae</i> (C)	35	75	78
<i>M. nonchromogenicum</i> (No)	10	24	28
<i>M. lactin</i> (L)	22	46	61
<i>M. vaccae</i> (V)	9	11	25
<i>M. neoaurum</i> (Ne)	0	19	17

Since their occurrence is much less in Toro, it is likely that BCG vaccination would fail in this area if a similar trial would be conducted there.

This hypothesis was extended to understand the cause of failure in Burma. As such antigens from a wider range of mycobacteria were tested in Burma. The results showed similar type of response by the 3 species of mycobacteria. However, it was also found that another species, *M. marianum* seemed to produce an opposite effect namely of suppressing the prophylactic effect of BCG. Further data confirmed the hypothesis. It is therefore suggested that the

occurrence of *M. marianum* in the environment inhibits the action of BCG as a prophylactic agent against leprosy.

Studies in Burma showed that BCG had a prophylactic effect in children less than 4 years of age. It was also found that sensitization to *M. marianum* occurs significantly by the age of 6 and by 11 years, a considerable proportion are sensitized. However, below 5 years, less than 10% are sensitized and if these children are vaccinated with BCG, there is good protection. There is thus a growing evidence to show that environmental mycobacteria play a role in influencing the prophylactic value of BCG. Work of Stanford et al has shown that organisms like *M. vaccae* and *M. non-chromogenicum* stimulate the action of BCG while *M. marianum* has the opposite effect of depressing it. A lot more of statistical data is required to confirm this standpoint.

In view of the interesting findings of Stanford et al a study of the environmental mycobacteria is being carried out at Wardha in collaboration with the Gandhi Memorial Leprosy Foundation. The work has just been started and only very preliminary data could be presented.

These 3 villages near are very adjacent. Still, it is seen that BCG effect is quite different in the 3 villages. While it is moderately good in villages Warud and Nandora, it is poor in Mandaogad, with regard to conversion of tuberculin, as well as leprosin. The possible cause of this difference is still to be investigated as the survey of mycobacterial population in this area is in progress.

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Table 8

*Result of skin test reactions (Wardha)*

Place	Total population tested	BCG vaccinated	BCG unvaccinated	BCG effect
<b>NANDORA</b>				
Scrofulin	94/226	47.5%	38.2%	+ 9.3%
A* _____ in	55/226	28.0%	22.2%	+5.8%
Leprosin A	43/226	26.8%	14.5%	+ 12.5% +
Tuberculin	102/226	52.4%	41.0%	11.4%
<b>MANDAOGAD</b>				
Non-chromogenicum	111/245	36.1%	52.5%	-16.4%
Vaccine Leprosin A	73/245	29.0%	30.0%	-1.0%
Tuberculin	102/245	37.0%	45.2%	-8.2%
	137/245	55.5%	56.2%	-0.7%
<b>WARUD</b>				
Kansasin	62/236	24.5%	29.2%	— 2.9%
Xenopin	38/236	14.0%	17.6%	—3.6%
Leprosin A	95/236	50.0%	33.7%	+ 16-3%
Tuberculin	154/236	72.0%	60.5%	+11-5%

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## EXCERPTS FROM THE PRESIDENTIAL ADDRESS OF DR. M.L. MEHROTRA

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1. Tuberculosis still ranks as one of the most important causes of morbidity and death in our country. Insufficient and inadequate tools, indifferent personnel with uncertain grounding and shifting priorities are the reasons for this state of affairs.

2. The national programme progressed satisfactorily up to the end of the IVth plan when it was centrally sponsored and internationally assisted. Thereafter there has hardly been any progress and inputs have decreased.

3. Correction is possible at this stage if the programme is again made centrally sponsored and assistance from friendly nations is accepted.

4. The Association must acquire political muscle for stepping up the anti-tuberculous activities.

5. Management of the National Tuberculosis institute, Bangalore should be handed over to the Indian Council of Medical Research: contents of training should be enlarged to include clinical aspects of tuberculosis and respiratory diseases; part of the training should be at the State Demonstration & Training Centres and refresher courses should be arranged every 3 years.

6. There should be one team for monitoring and follow up for every 10 districts.

7. The Technical Committee of the Tuberculosis Association of India and the Medical Council should jointly review the under-graduate training in tuberculosis and internship programme every 3 years.

8. Continuing health education in respect of tuberculosis and smoking should be mandatory for every district Association. Awareness about the disease and the control programme should be created amongst the politicians also.

9. Case-finding should be stepped up at least three-fold.

10. Bureaucratic hold on voluntary organisations like the Tuberculosis Associations and its branches should be minimized.

11. Rewards and incentives should be provided at all levels to improve the outputs.

12. The Tuberculosis Association of India should recommend to the W.H.O. to obtain a mandate from the WHO General Assembly for fighting tuberculosis as a global problem and bringing down its prevalence to 0.01% within a period of 20 years.

# Summaries of the Papers Presented at the 34th National Conference on Tuberculosis & Chest Diseases at Jaipur from 28th to 31st October, 1979.

## SYMPOSIUM ON ORGANISATIONAL AND ADMINISTRATIVE PROBLEMS IN THE IMPLEMENTATION OF THE NATIONAL TUBERCULOSIS CONTROL PROGRAMME.

Moderator : Dr. N.L. Bordia

Participants ; Drs. B.N.M. Barua, G.A. Panigrahi, V. Chittur Seshu, K.S. Aneja, B.C. Arora, R.K. Sharma  
G.P. Saxena & H.P. Ramcharan

The genesis of the national tuberculosis programme and its working during the initial years was traced and causes of poor implementation and unsatisfactory functioning were identified. The following main reasons were highlighted :

The programme is no longer centrally sponsored ; international assistance is virtually stopped; phenomenal rise in the cost of petrol and other essentials leading to reduction in the mobility of personnel and supervision of the programme; lack of uniformity in the pattern of health administration in different states; gradual weakening of the central supervision and direction; low priority to the tuberculosis programme as against other national programmes; failure on the part of the state supra-structure in assuming, and accepting responsibility for the programme; integration of BCG programme with general immunization without prior and clear-cut decision on the logistics thereof; supply of BCG kits; disparity in the status, qualification and working conditions of the DTOs from state to state; disproportionately inadequate output of case-finding in the PHIs because it is at present nobody's responsibility.

The following recommendations were made by the panel:-

1. Adequate and regular supply of drugs, x-ray films, stains, BCG kits, P.O.I., etc. should be assured ; procedural bottle-necks in respect of repairs and maintenance of essential equipment and vehicles should be eliminated.
2. Tuberculosis control should again be made a centrally sponsored scheme and the programme should be extended as expeditiously as possible to all the remaining districts of the country.
3. Supervision of the programme by the Directorate-General of Health Services should be intensified to make the programme more effective and uniform in all states. Machinery for processing of health intelligence should be geared up.
4. As far as possible the pattern of health administration suprastructure should be uniform in all the states. There must be a qualified and experienced state tuberculosis officer in every state, who should have a rank commensurate with his responsibilities.
5. Districts with a population of 2.5 million or more should have 2 district programmes.
6. Tuberculosis should be made the responsibility of DHO/DMOH. These jobs as well as the DTO should be non-practising posts.
7. Quarters should be provided for those members of the staff who are on touring duties.
8. There should be an exclusive person at each PHI for sputum examination, drug distribution and default etc. The laboratory technician is a must in a busy primary health centre.

## REPORT ON TB PREVENTION TRIAL

**G.VJ. BAILY**

The protective effect of BCG vaccination is being evaluated in a controlled community trial near Madras. The population was tested with PPD-S and PPD-B and radiographic and bacteriological examinations were carried out. BCG vaccines and placebo were allotted randomly to about 260,000 individuals, of whom 115,000 were Tuberculin negative at the time of vaccination. Two vaccines (French strain 1173 P2 and the Danish strain 1331) were used. Two doses viz. the usual and 1/10th of the usual strength of each vaccine were used. Intensive efforts are being made by means of regular follow up surveys to identify all new cases of tuberculosis occurring in this community. Results of the first 7.1 /2 years of follow up were presented. Incidence of infection is high in this population. However, incidence of bacillary pulmonary tuberculosis was much more frequent among initial tuberculin reactors especially among the older persons, than among non-reactors of whom the majority were in younger age groups. The distribution of new bacillary pulmonary cases among those not infected at the intake did not show any evidence of protective effect of the BCG in respect of this type of disease.

### PANEL DISCUSSION ON “PRESENT-DAY MANAGEMENT OF PULMONARY TUBERCULOSIS”

Moderator : S.P. Pamra  
 Panelists : M.L. Mehrolra. H.B. Dincley S.P. Tripathy.  
 K.V. Krishnaswami, T.N. Sharma, P.A.  
 Deshmukh & K.C. Mathur.

The panel discussed the problem of management of pulmonary tuberculosis in all aspects. The following points represent the consensus among the panelist:

1. Because of the gap in the knowledge about *in vivo* action of drugs, the policies in respect of drug regimens should be based on the results of controlled clinical trials.
2. Since the choice of a particular drug depends not merely on its action on the tubercle bacillus but also on its acceptance, cost and ease of administration, it is unrealistic to classify the drugs as first line and second line drugs. It is more rational to categorize them in respect of their action on the bacillus viz. bactericidal and bacteriostatic.
3. While two drugs, one of which must be INM are adequate for genuinely untreated cases involving only one system, three drugs to begin with are necessary for those who have been treated previously but the previous treatment had been a failure, or where more than one system is involved. If there is any doubt about the patient having taken treatment earlier or not, it is desirable to start treatment with three drugs.
4. Periodic sputum examination is essential for assessment during the course of treatment. X-ray examination is desirable if available but is not essential. Persistence or otherwise of symptoms cannot be relied upon as cough and sputum may persist even when the lung lesion is healed because of the pre-existing chronic bronchitis or may be the sequela of extensive fibrosis in the lung following chemotherapy.
5. Although initial drug resistance does detract appreciably from the results but the contribution of initial drug resistance to failure is much less than that of other factors like injudicious regimens, inadequate doses and irregularity in taking of drugs by the patient. There is no evidence that initial drug resistance is rising in the country.
6. Contrary to initial drug resistance, acquired or emergent drug resistance is a sure indication of failure of treatment. The level of emergent drug resistance varies amongst institutions depending on the type of patients attending therein. Sensitivity testing is not absolutely essential for assessment of a case. If sputum continues to be positive inspite of regular drug treatment or the sputum having become negative, becomes positive again it is a sure sign of emergent drug resistance.

7. Management of failures is extremely difficult and drugs required for such cases viz. Rifampicin and Pyrazinamide being so costly, it is essential that every effort should be made to achieve success of the initial treatment.

8. Surgery at the opportune time may avert many failures in treatment. Surgery under the umbrella of previously unused drugs may also help to arrest the disease in many failure.

9. Relapse rates have been considerably reduced recently where judicious, adequate and regular treatment is made available. Relapse rates after surgery are more or less of the same order as in cases where treatment is entirely medical. Relapse is not necessarily caused by resistant bacilli and depends more or less on the same factors as are responsible for the onset of disease. Many arrested cases sometimes develop symptoms and radiological exacerbation simulating relapse. The value of positive sputum and a short period of observation to exclude non-tuberculous lesions being considered as relapse was highlighted.

10. It is no longer necessary to hospitalize every patient. Surgical treatment and complication which cannot be attended to in patient's home were the main indications for hospitalization. Since infective potential of even a sputum positive case who is taking drugs regularly is minimal, positive *per se* is not an indication for hospitalization.

11. Domiciliary treatment was found to be as effective and as safe as hospital treatment, in the Madras Chemotherapy Trial 20 years ago. The panelists were unanimous that experience during the last 20 years has confirmed the effectivity and safety of domiciliary treatment.

#### **CHEMOTHERAPY OF TUBERCULOUS MENINGITIS WITH ISONIAZID PLUS RIFAMPICIN - INTERIM FINDINGS IN A TRIAL IN CHILDREN**

T.B. RESEARCH CENTRE, MADRAS

(Paper being published in full)

#### **A CONTROLLED STUDY IN THE MANAGEMENT OF TUBERCULOSIS OF THE SPINE**

TB RESEARCH CENTRE, MADRAS

A co-operative study in which 6 orthopaedic surgeons of Madras are participating is in progress to assess the efficacy of short-course chemotherapy with or without surgery in tuberculosis of the spine. Nearly 60 patients were admitted to each of the 3 groups. One group was given Rifampicin and INH for 6 months with radical surgery. The second group was given Rifampicin and INH for 6 months without surgery and the third group was given the same drugs for 9 months without surgery. Surgery consisted of excision of diseased vertebrae and bridging of the resultant gap with bone grafting and was usually performed within a month of admission to the study in the first group.

The three groups were comparable in respect of number of vertebra involved, abscess formation and nervous involvement. 65% of the patients had 2 vertebrae involved, 34% had 3 or more vertebrae involved. 21% had clinical evidence of abscess and/or sinus. 54% had mediastinal or psoas abscess shadows in the x-rays 85% had kyphosis and 95% had limitation of spinal movements. 17 patients had neurological involvement.

92% of the patients in the surgery group as against 62% in the other two groups showed resolution of the abscess within 3 months. By 9 months resolution had occurred in all but one patient belonging to the third group. All the patients with nervous involvement recovered completely except that 3 patients in the non-surgery group had to undergo surgery for neurological relief. There were 3 post-operative deaths in the surgery group. 14% of the patients had jaundice in the entire series. There is a suggestion that jaundice was more frequent in the surgery group.

56% in group 1, 8% in group 2 and 2% in group 3 had unfavourable response at 18 months. On the available evidence at present the 2 non-surgery groups have behaved practically as well as the surgery group. It is not possible to say at this stage whether the surgery group derived the three benefits of radical surgery (more frequent and early bony union, less kyphosis and more rapid resolution of the abscess) or not.

## **DIAGNOSTIC CLINICAL PROFILE OF CERVICAL LYMPHODAL TUBERCULOSIS IN CHILDREN AND ADOLESCENTS**

I.P. ELHANCE

Sixty one children and adolescents with enlarged glands in the neck were studied in Agra in 1978. Most of the cases had multiple group involvement. Enlargement was larger in size in tubercular adenitis, as compared to non-specific adenitis. In 32% of the cases of tubercular adenitis, lungs were also involved. The tuberculin reaction was less than 10mm in 9.1% tuberculous glands. The author concludes that if the size of the largest cervical gland is 2.5 cm or so, tuberculin sensitivity 20 mm or more, ESR 30 mm or more in first hour and the duration of the gland is less than 3 months, the diagnosis of tuberculous adenitis can certainly be made even when there is no periaadenitis and systemic manifestations are absent. However, there can always be cases where these parameters may fail to indicate aetiology. Histology of the lymph gland is mandatory in these cases.

### **ATYPICAL MYCOBACTERIOSIS**

P.R.J, GANGAPIIARAM

(Paper is being published in full)

### **PREVENTION AND RETRIEVAL OF DRUG DEFAULT IN THE DOMICILIARY TREATMENT OF PULMONARY TUBERCULOSIS**

**NEW DELHI T.B. CENTRE**

Two controlled studies were carried out at the New Delhi TB Centre to find out whether home visiting plays any part at all in the management of drug default and if so whether such visiting should be carried out as a routine in all patients before the due date of drug collection or should be made only after default has occurred and whether letter writing, can replace home visiting. Four hundred and sixteen patients in the domiciliary treatment area of the Centre in one study and 328 in the second were followed for one year. The studies show that: some sort of defaulter action is necessary. In the initial stages of treatment, visit before the due date of drug collection gives better results than home visit after the default has occurred. Action through writing letters is not very inferior to a visit to the patient's home. The extent of irregularity increases with the duration of treatment irrespective of the type of defaulter action. Taking cost of defaulter action also into account it appears that the policy of writing letters to all patients before the due date of drug collection and home visiting only when such letters fail to retrieve the defaulter would yield best results.

### **A CONTROLLED STUDY OF POLICIES FOR THE MANAGEMENT OF DEFAULT IN PATIENTS UNDER TREATMENT IN THE NATIONAL TB PROGRAMME**

K.V. KRISHNASWAMI

One hundred and thirty four patients 12 years or more in age and living within a well defined area of Madras were admitted to the study. Routine defaulter action consisted of writing a letter on the 4th day after default followed by a home visit by the health visitor on the 11th day if default continued in spite of letter. In the special policy the first defaulter action also was by a home visit and 3 more visits were paid to the patients home during two months, if default continued. The study has shown that the regularity in drug taking was better on patients allocated to the special policy group. The difference between the two policies was statistically significant in respect of 70% regularity in drug taking. The retrieval was earlier in special policy than in the routine.

### **THE EFFICACY OF ADDRESS CARDS, HEALTH VISITORS & REGISTRY CLERKS IN OBTAINING THE HOME ADDRESS OF URBAN PATIENTS IN SOUTH INDIA**

S. RADHAKRISHNA

Since the addresses of the patients are often found to be incomplete and inaccurate, a method of "address card" was tried wherein a post card was given to the patient with an oral and written

request that he should get his complete and accurate address recorded on it by the local postman or a literate neighbour, relative or friend. The efficiency of "address card" was assessed by posting letters to patients and verifying whether or not these post cards were received. The results show that address card method was appreciably more efficient than the verification of address through health visitors and substantially more efficient than recording of address by the registration clerks. The method had an overall acceptability rate of at least 95% in Madras city and some other urban areas. The method is also inexpensive, convenient and acceptable.

### **INFLUENCE OF MOTIVATION ON TREATMENT OF TB PATIENTS**

**K.S. ANEJA**

(Paper will be published in the July, 1980 issue)

### **EFFECT OF MOTIVATION OF FAMILY MEMBERS ON THE COMPLETION OF TREATMENT**

**M.A. SEETHA**

(Paper not received)

### **PROBLEM OF DRUG DEFAULT IN THE URBAN AND RURAL COMMUNITY**

**A.A. KHAN**

Two hundred and fifty non-cooperative patients (where default continued in spite of 3 visits) were studied in TB Centre, Patna in 1976-77. One hundred of these patients were sputum positive at the time of default. Forgetfulness was the most important cause, followed by disappearance of symptoms and loss of wages. These three reasons accounted for most of defaulters. Visits to the homes by health visitor or a public health nurse were effective. Visit by the medical officer was most effective in cases of continued default.

### **STUDY OF TREATMENT BY POST AND FOLLOW-UP OF TB PATIENTS**

**P.V.P. RAO**

Twenty patients attending JIPMER OPD (Pondicherry) were selected for the study. Their current postal address was ascertained and the drugs were sent to them by post on receipt of Rs. 2/- from them in advance for postal expenditure. Most of these patients who were irregular previously started taking drugs regularly at considerable saving to them in respect of expense incurred on the visit to the clinic for collecting drugs personally.

### **THE VALUE OF GROUP THERAPY IN THE MANAGEMENT OF LEPROSY PATIENTS**

**S. SUNDARAMMAL**

One hundred and three leprosy patients, 29 female and 74 males were subject to 'group therapy' at Schiefflin Leprosy Centre. The basic principle of group therapy was to bring together the patients and allow them to have free discussions under the guidance of a therapist or group leader about the various aspects of the disease. The performance of the patients after group therapy was compared with their performance before the session. Group therapy sessions produced substantial improvement in the knowledge, attitude and practices of the leprosy patients.

### **CHRONIC NON-SPECIFIC RESPIRATORY DISEASE IN PULMONARY TUBERCULOSIS**

**M.Y. KAWOOS**

One hundred cases of pulmonary tuberculosis, 72 males and 28 females were studied for evidence of airway obstruction in K.G. Medical College, Lucknow. Airway obstruction was present in 58% cases, was found closely related to age (higher in higher age groups), sex (higher in males), smoking

habits (higher in smokers) and extent of chronicity of the tuberculous lesions. Respiratory symptoms were more marked in those with evidence of airway obstruction. Eight weeks of effective chemotherapy did not significantly affect the airway obstruction.

### **CHRONIC COR PULMONALE IN CHRONIC PULMONARY TUBERCULOSIS**

K.V. KRISHNASWAMI

(Paper being published in full)

### **ASSESSMENT OF PULMONARY FUNCTION IN CERTAIN COMMUNITY SURVEYS AND PULMONARY DISEASES**

MRS. K. KRISHNASWAMI

Chronic obstructive pulmonary disease can easily be detected by estimation of the Peak Expiratory Flow Rate (PEFR). In asthma, pulmonary function tests show an obstructive pattern with definite broncho-dilator improvement whereas in chronic bronchitis, bronchodilator improvement is moderate and in emphysema negligible. In a study among cycle rickshaw men in Madras PFTR showed significant rise in the mean (257.43). The standard deviation (98.17) is indicative of less dispersion as compared to healthy South Indian men probably because of better ventilatory functional capacity in view of their occupation. The values did not differ significantly amongst smokers and non-smokers.

### **SMOKING HABITS AND PSYCHOMETRY OF SMOKERS IN STUDENT COMMUNITY OF HIMACHAL PRADESH**

V.K. ARORA

The prevalence of smoking was 16.4% in males and 8% in female students. The number of cigarettes smoked per day did not vary significantly with sex. 78% of male smokers and 83% of female smokers smoked cigarettes and the remaining smoked 'Bins'. Addiction was found in 22% males and 5.5% female smokers. 84.3% male students started smoking at the age of 11-20 years while this percentage for female students was 66.7%. Sex also was seen to be associated with the personality traits, initiation and addiction. Sex however had no relationship with the number of cigarettes smoked, the smokers attitude towards smoking and willingness to give up smoking.

### **SURGICAL APPROACH TO THE MANAGEMENT OF CHRONIC OBSTRUCTIVE LUNG DISEASES**

A.L. ANAND

Thoracotomy and excision of bulla/cysl was carried out in 8 cases of pulmonary emphysema. The cases have been followed for 3-5 years. Excision resulted in decrease of parenchymal compression, correction of mediastinal shift, decrease in diaphragmatic immobilization thus facilitating ventilatory function of the lung and chest wall. There were no operative deaths. Six patients got definite relief from symptoms. Two patients who were not relieved had marked generalised emphysema.

### **SOME ASPECTS OF CIGARETTE SMOKING FROM A CHEMISTS POINT OF VIEW**

P.L. ITTYERAH

A study is being carried out to estimate the tar content in the smoke of cigarettes and to identify and estimate the major constituents in these Tars. The weight of tar per cigarette without filler varied from 23.5 to 37.9 mg per cigarette and with filler from 10.1 to 11.5 nig in different brands of cigarettes. The upper limit of tar found in cigarette smoke for some brands used in other countries are 15 mg in U.K., 19 mg in Canada and 22 mg in Australia. Ethanolic solution of the tar gives a precipitate with picric acid which indicates the presence of some heterocyclic bases and polynuclear hydrocarbons (which have carcinogenic activity) in the tar.

## **THE VALUE OF SYMPTOMS AS A SCREENING DEVICE FOR DETECTING TB CASES IN THE COMMUNITY**

NEW DELHI T.B. CENTRE

A population of nearly 8,000 in the domiciliary service area of the New Delhi TB Centre was surveyed to determine the efficiency of symptoms as a screening device for detecting pulmonary tuberculosis in the community, 7% of the persons above the age of 15 had symptoms referable to the chest. Of these, 6.2% had cough with or without symptoms, 32% of the males and 2% of the females were smokers. The prevalence of cough was higher in smokers than in non-smokers and higher in higher age groups. There was no significant difference in the prevalence of cough in non-smoking males and females. If instead of the entire population, only persons with cough of any duration were included in the survey, 75% of the bacillary and 46% of the total active cases (bacillary as well abacillary) would have been detected. If, however, only cough of 2 weeks or more was taken into consideration, 5.7% of the population would have been examined and it would have yielded 75% of the bacillary and 44% of the total bacillary and abacillary cases. Including the smokers amongst those to be examined, yield of bacillary and total cases would have improved to 80% and 56% respectively but the number of persons to be examined would have increased from 5.7% to 22.4%. If x-ray facilities were not available, sputum examination alone would have helped to detect only 50% of the bacillary cases. Cough of 2 weeks or more in duration is thus a very efficient screening procedure for detection of unknown cases of pulmonary tuberculosis.

### **DISEASE AMONG HOUSEHOLD CONTACTS OF TUBERCULOSIS PATIENTS**

V.K. DHINGRA

Nearly 2,000 household contacts of 670 index cases from the domiciliary service area of New Delhi TB Centre were examined to determine the prevalence of disease amongst this group. The coverage was over 90%. The prevalence of active tuberculous disease was about 3%. The prevalence was significantly higher among the contacts of bacillary cases as against the contacts of abacillary cases. The prevalence was significantly lower amongst contacts who had been vaccinated earlier as against those who were not vaccinated. Most of the contact cases had minimal disease and far advanced disease was present only in 11% as compared to 54% amongst patients reporting voluntarily at the New Delhi TB Centre. A higher tuberculin sensitivity was found to be associated with higher risk of developing disease. The overall prevalence in this study is appreciably less (3%) as compared to the earlier study (7.8%) carried out by the Centre in the same population 17 years ago.

### **FACTORS INFLUENCING THE YIELD OF ANCILLARY CASES THROUGH SPUTUM MICROSCOPY UNDER TB CONTROL PROGRAMME**

J.P. MISRA *et al*

Three sputum specimens from 25 patients were examined. Two slides were made from each specimen and each slide was examined microscopically by two persons in TB Centre, Agra. Demonstration of bacilli was significantly influenced by the quality of the microscopist and the time spent in seeing the slides. Whether the sputum was spot or over-night collection did not set in to make tiny difference provided the staining and microscopy was efficient.

### **TIMING OF BCG VACCINATION IN INFANTS**

S.K. DAS

(Paper being published in full)

### **SYMPTOMS EVALUATION IN THE DIAGNOSIS OF PULMONARY TUBERCULOSES**

N. SETHURAMAN

Five hundred and three patients were questioned for symptoms with a view to determine the value of each symptom in the diagnosis of pulmonary tuberculosis. Haemoptysis, cough and expecto-

ration of more than 3 months' duration were associated significantly more often with the diagnosis of pulmonary tuberculosis. The other symptoms did not show any significant difference.

### **LEVAMISOLE IN PULMONARY TUBERCULOSIS**

M.M. SINGH and PRHM KUMAR

Fifty newly diagnosed indoor patients were given levamisole for 3 months in addition to INK and Thiacetazone, Fifty comparable patients (controls) were given only INH A. Thiacetazone. All patients had some degree of immune-depression as shown by their inability to get sensitized to DNCB. Levamisole group showed significantly better radiological clearing, though there was no difference in the rate and speed of sputum conversion. 50% of the patients in the levamisole group became reactors to DNCB as against 18% only in the control group,

### **SERUM PROTEINS IN HEALTH & PULMONARY TB**

V.K. MHIITA

Serum protein values in 27 normal adults ranged from 8.34 gms to 6.34 gms. per cent with no sex variation while in the untreated 107 cases it ranged between 7.7 gms and 4.7 gms per cent, the decrease of 17% below normal being proportionate to the extent of the disease. Serum albumin values were also found to be decreased by 45%. After treatment the total serum protein reached almost normal levels but albumin values continued to be decreased in 23%. Alpha-1 globulin was found increased in both treated and untreated groups (15% and 21% respectively), the difference being not significant, Alpha-2 globulin and gamma globulin were significantly raised in both groups. Albumin/globulin ratio was decreased by 48% in both untreated and treated groups while albumin/Alpha-2 globulin ratio was decreased by 47% and 46% in treated and untreated groups respectively. Serum protein electrophoresis however cannot be used as a diagnostic aid in pulmonary tuberculosis as the changes are non-specific and have limitations.

### **CERULOPLASMIN ESTIMATION IN PULMONARY TB**

P.K. GUPTA

Serum Ceruioplasmin estimation was carried out in 40 sputum positive cases of pulmonary tuberculosis, 20 abacillary but active pulmonary cases, 20 inactive cases and 30 normal individuals. Serum Ceruioplasmin level runs parallel to the activity of the lesion and gradually comes to the normal level with effective chemotherapy. It has no relation to the radiological extent of disease.

### **SKIN TEST REACTIVITY TO LOCAL ALLERGENS IN BRONCHIAL ASTHMA**

K.V. RAMANA RAO

(Paper being published in full)

### **CHRONIC ALLERGIC PERENNIAL BRONCHIAL ASTHMA TREATED BY BECLOMETHASONE DIPROPIONATE AEROSOL**

HARHIAR DAS

Twenty two intermittently steroid dependant patients suffering from chronic perennial allergic bronchial asthma were put on Beclomethasone Dipropionate aerosol for a period of 2 weeks in doses of 400 meg daily. Two patients showed deterioration while under treatment There was no effect on pulmonary function tests in one patient and the remaining 19 showed significant improvement clinically and in lung function, The improvement was more marked at the end of second week. There was significant reduction in the dosage of broncho-dilators. There was no evidence of adrenal suppressant effect and there were no side reactions. Response was not influenced by age, sex or age of onset of asthma. Beclomethasone Dipropionate aerosol seems to be a suitable alternative to systemic corticosteroids in patients suffering from chronic perennial allergic bronchial asthma, not effectively controlled by broncho-dilators.

**RESPIRATORY SYMPTOMS AND PULMONARY FUNCTION TESTS FROM  
EXPOSURE TO VEGETABLE DUST (TOBACCO)**

S.K. KASHYAP & RAO

A clinical and pulmonary function tests study was undertaken in 200 tobacco dust workers engaged in agricultural operations like up-rooting of plants, plucking of leaves, curing and roasting etc. and 126 controls (agricultural workers not involved in tobacco work). The major respiratory symptoms among tobacco workers were dyspnoea (21.5%) and chronic cough (9.5%). Pulmonary function tests ( $\dot{V}_C$ ,  $FEV_{17}$ , FEF) in tobacco workers showed evidence of both obstructive and restrictive type of lung disorder,

**CLINICO-IMMUNOLOGICAL SIGNIFICANCE OF THE LEPRONIN TEST—**

**A RE-APPRAISAL**

K.V. DFSIKAN *et al*

(Paper being published in full)

**PREVALENCE OF PULMONARY TB AMONG INDUSTRIAL WORKERS IN BOMBAY**

K.C. MOHANTY

Twenty five thousand seven hundred and seventy six industrial workers were examined in Bombay. Four hundred and twelve (1.6%) had radiological shadows. 1.53% were suggestive of tuberculosis and the remaining 0.07% were probably non-tuberculous. Of the tuberculous cases, 1.03% were active and 0.5% inactive. Sputum was examined in only 2.96 out of 393 cases diagnosed as tuberculous and was positive only in 46. Overall prevalence rate in these industrial workers is not higher than the national rate, though workers in heavy engineering and textile industry had a higher prevalence rate. In industries where pre-employment and radiological check up was being carried out, the prevalence rate was lower,

**SURVEY AMONG WORKERS IN THERMAL POWER STATIONS**

K.V. KRISHNASWAMI

Two thousand five hundred and sixteen workers in Thermal Power stations in Madras were examined. Majority of them were in the age group 30 to 44 years and earning less than Rs. 500/- p.m. The rate of bacillary pulmonary tuberculosis was 2.3% in those above 45 years in age and 1.18% in those under 45 years. The difference in the bacillary active cases was significant (9.6% and 5.01% respectively). There was no difference in respect of income. The common non-tuberculous conditions found were emphysema, fibrosis pneumonitis and bronchiectasis. The proportion of these was higher in persons who had worked for 15-20 years whereas the proportion of patients with pulmonary tuberculosis was more in those who had worked for 5-10 years and 10-15 years.

**TUBERCULOSIS IN WORKERS ENGAGED IN DIAMOND CUTTING AND  
POLISHING INDUSTRY**

A.L. ANAND

Seven hundred and fifty male workers engaged in diamond cutting and polishing industry were examined. 90% were between 14 and 22 years in age and had been working in this industry from six months to two years. Productive cough was present in 75%, exertional dyspnoea in 46%, and chest pain in 28%. Haemoptysis was occasional. 7.5% of these had active pulmonary tuberculosis, 1/4th of whom were sputum positive.

**CLINICAL-RADIOLOGICAL STUDY OF SILICOSIS AMONGST STONE WORKERS  
OF JODHPUR**

S.D. PUROHIT

Four hundred and eighty six male stone workers (31% in 21-25 age group) were examined. Two workers were more than 55 years in age and 7 below 20 years. Silicosis was present in 47 cases,

Pulmonary tuberculosis was present in 93 cases and in 10 cases silicosis and tuberculosis were both present. Bronchiectasis was present in 78 case, chronic bronchitis in 106, emphysema in 100 and pleural thickening without calcification was seen in 4 cases. Dressers arc more prone to develop silicosis and tuberculosis due to high concentration of small size free silica particles. The pattern or ventilatory function was both obstructive as well as restrictive, disability increasing with the severity of silicosis. The main radiological silicotic lesions were nodular opacities of varying sizes and increased streakiness.

### **CHILDHOOD RESPIRATORY DISORDERS NEEDING IMMEDIATE SURGICAL**

#### **INTERVENTION**

**HARI GAUJAM**

(Paper being published in full)

### **FIBEROPTIC BRONCHOSCOPY**

**S.K. SARKAR**

One hundred and five cases of bronchoscopy with fiberoptic bronchoscope are reported from Jaipur Chest Hospital. Lesions were in upper lobe in 56. In 5 patients previous examination with rigid bronchoscope was negative and in 2 of these fiberoptic bronchoscopy was successful. Out of 105 patients, the pulmonary pathology could be ascertained in 103 patients. There was no serious complication.

### **SURGICAL MANAGEMENT OF PULMONARY GIANT CAVITIES**

**V.K. SHARMA**

Drainage of large cavities was carried out in 11 patients where resection was not possible. Sputum was positive by direct smear in 8 patients. Intra-cavitary pressure was above atmospheric in 6 patients, and atmospheric in the remaining 5 patients. Average age of the patients was 36 years, the youngest being an 18 years old boy. The intra-cavitary drainage was instituted anteriorly under local anaesthesia and the catheter was connected to the under water seal. Seven of the sputum positive cases became negative. Cavity closure was obtained in 6, reduction in size in 2 cases and no response in 3 cases. Thoracoplasty was subsequently carried out in 2 patients.

### **MANAGEMENT OF SPONTANEOUS PNEUMOTHORAX**

**R.C. JAIN & M.M. SINGH**

Sixty patients of spontaneous pneumothorax from R.B.T.B. Hospital Delhi were reported. The cause was pulmonary tuberculosis in 30 and idiopathic in 19. Emphysema was present only in 2 cases. Twenty patients who had less than 20% pneumothorax were treated conservatively. Inter-costal intubation was carried out in 40 patients with a bigger than 20% pneumothorax. Resection was carried out in 4 patients, decortication in 2 and pleurectomy in 1. Intubation is preferred if possibility of tuberculosis cannot be excluded in the collapsed lung. With conservative treatment the average time of complete re-expansion was 45 days (range 15 to 150 days) as against 2.4 days (range 1-16 days) in intubation cases. Intubation did not increase the rate of infection.

### **A SHORT-TERM CHEMOTHERAPY TRIAL**

**TUBERCULOSIS ASSOCIATION OF INDIA**

(Paper being published in full)

### **SHORT TERM CHEMOTHERAPY IN CHILDREN—A PRELIMINARY REPORT**

**H.B. DINGLEY**

The results of one year's treatment of 124 children suffering from the primary and post-primary types of pulmonary tuberculosis randomly allocated to one of the four drug regimens were presented.

The regimens were : I.N.H. + P.A.S. + Thiacetazone; INH + Pyrazinamide + Ethambutol; INH + Pyrazinamide + Rifampicin; and INH + Thiacetazone. Patients in the first three regimens received treatment for 26 weeks and placebo for the following 26 weeks while patients in the last group were given drugs for 52 weeks. Sputum conversion was almost equal in all regimens and quicker than in older age groups. Radiological clearance was better in Rifampicin regimen.

#### **INTERMITTENT ONCE A WEEK RIFAMPICIN SHORT-COURSE THERAPY**

A.G. PATEL

Two hundred and forty eight patients were randomly allocated to two groups. In the first 13 weeks all patients were given Streptomycin, INH and Rifampicin once a week. The subsequent treatment was for 12 weeks in group A and 23 weeks in group B. Patients in group A were given INH and Ethionamide once a week in slow inactivators and twice a week in rapid inactivators. Patients in group B were given INH and PAS twice a week. Sputum conversion was 100% in regular patients (85%). Eleven patients (8.2%) relapsed in 6 months. The cost of drugs varied from Rs. 140/- to Rs. 170/-. One patient developed immunological reaction to Rifampicin. Adverse reactions to Rifampicin occurred in 1.2%, to Streptomycin in 1.6%, PAS 3% and Ethionamide 26%. 73% of the patients completed the treatment but if death, migration and failure to follow the protocol are excluded, the acceptability of treatment was 85%.

#### **SIGNIFICANCE OF AFB POSITIVE SMEARS IN SPUTA IN SHORT COURSE CHEMOTHERAPY**

T.B. RESEARCH CENTRE, MADRAS

Sputum examination results of nearly 2,500 patients on standard regimens, 1,100 non-Rifampicin short-term regimens and 1,300 Rifampicin regimens were reported. Whereas percentage of direct smear positive but culture negative specimens was 1-3% in standard regimens, it was 2-13% in non-Rifampicin regimens and 2-17% in Rifampicin regimens in the first 6 months of treatment. While in standard regimens, killing of bacilli and their elimination from the lungs probably kept pace, in short-course regimens it is likely that the elimination of dead bacilli does not keep pace with their rapid killing. Therefore, using sputum smears for monitoring the progress of patients on short-term chemotherapy (as against standard regimens) is not desirable. A large proportion of patients with positive smear (and negative culture) have a favourable response ultimately.

#### **RE-TREATMENT OF RESISTANT CASE OF PULMONARY TUBERCULOSIS**

M.S. PARMAR

Seventy five cases of pulmonary tuberculosis who had treatment irregularly for 1-10 years and were still sputum positive were treated with various combinations of 3-4 drugs for a period of 6-24 months. Large cavities were present in 42 patients. Fourteen patients took the treatment for 6 months and 45 patients for 1-2 years. No radiological change was observed in 19 patients, the cavities being less than 4 cm. in diameter. Sputum did not get converted in 11 and there was reversion after initial conversion in 4 patients. Thoracoplasty was done in 5 cases and in 1 case decortication and thoracoplasty were done during the course of chemotherapy.

#### **HYPERSENSITIVITY REACTIONS TO THIACETAZONE**

J.L. BHATIA

Impressions of thiacetazone toxicity were presented. Toxic reactions to thiacetazone are very common and occur most frequently in the first 8 weeks. In case of reaction all drugs must be completely withdrawn. Massive doses of corticosteroid intravenously or otherwise with supportive drip treatment with anti-histaminics and soothing lotions are helpful. Vigorous and early treatment can save many lives.

**SOME OBSERVATIONS ON THE BIO-CHEMICAL ASPECTS OF THIA CETAZONE  
TOXICITY**

P. KHAN

(Paper not received)

**ISOVIN THERAPY IN PULMONARY TUBERCULOSIS**

A.A. MALIK

Forty cases of pulmonary tuberculosis were treated with Streptomycin, PAS, and Isovin (1 gm daily in two divided doses); 16 with Isovin, Ethambutol and Ethionamide; 20 cases (controls) with Streptomycin, INH and PAS and 8 controls were treated with INH, Ethambutol and Prothionamide. Ten cases were treated with Isovin alone (2 gins daily). They were all sputum positive by direct smear to begin with. Sputum conversion by direct smear after 6 months' treatment was 97%, 90%, 87.5% and 75% in the first 4 groups respectively. Isovin has practically no toxic reactions and is recommended in case of INH intolerance.

**OBSERVATION OF TOXIC AND ADVERSE REACTIONS OF DIFFERENT  
ANTI-TUBERCULAR DRUGS**

C.S. SRIVASTAVA

The study is based on 500 cases developing toxic and adverse reactions to anti-TB drugs in TB Centre, Agra. The identity of the offending drug was established by withdrawal of all drugs, and then re-starting the drugs. Some of the important reactions noted were 10 cases of Streptomycin toxicity (6 renal, 2 vestibular and 2 deafness); 20 cases of hyper-sensitivity reaction to streptomycin; 2 cases of hepatitis and jaundice due to Thiacetazone; 37 cases of hyper-sensitivity reaction to Thiacetazone; 15 cases of INH toxicity; 7 cases of Pyrazinamide adverse reactions (mainly pain in the knee joints and small joints of fingers and toes) and 11 cases of toxic reaction to Ethionamide. Hyper-sensitivity reactions to Rifampicin were observed in 2 patients (1 cutaneous involvement and 1 gastric symptoms).

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**Citation read on the occasion of the presentation of the  
TAI Gold Medal to Dr. T. J. Joseph, former Medical  
Superintendent, Lady Linlithgow Sanatorium, Kasauli  
(Simla Hills) on 28-10-1979.**

The Tuberculosis Association of India awards a 'Gold Medal' every year to a person who has rendered outstanding service to promote the cause



Born in February 1898 in Kerala, Dr. T.J. Joseph graduated from the Madras Christian College in 1922 and took his MBBS degree from the Madras Medical College in 1927. In 1928 he was appointed as a Medical Officer in the U.M.T. Sanatorium, Arogyavaram, Madanapalli. While working in this Sanatorium he was awarded an International Scholarship for a six months study of Tuberculosis in the Carlo-Forlanini Tuberculosis Institute, Rome, after which he took the P.M.R. degree. On return to India he continued to work in the U.M.T. Sanatorium till 1937 when he was appointed as Medical Superintendent of the Pendra Road Sanatorium in Madhya Pradesh. He was responsible for modernising and expanding that institution and also for starting an ex-patients colony there. In 1941, Dr. Joseph was appointed as Medical Superintendent of the Lady Linlithgow Sanatorium, Kasauli, in which capacity he continued till he retired in 1962. From a very modest Sanatorium soon became one of the foremost tuberculosis institutions of our country and an excellent teaching and training centre. This phenomenal success is a testimony to the dedicated and selfless efforts of Dr. Joseph. He commanded respect and admiration of all including his colleagues, patient students. He had a name among the savants of the profession.

Dr. Joseph served as Honorary Technical Adviser of the Tuberculosis Association of India for Northern India for the period 1941-44. He was a member of the Technical Committee of the Association from 1955 to 1961 and Chairman of the Committee for 1956. He presided over the 13th National Conference on Tuberculosis and Chest Diseases held in Trivandrum in 1956. He was Co-Editor of the *Indian Journal of Tuberculosis* since its inception in 1953 upto 1962. Dr. Joseph has contributed several scientific papers. He is widely remembered as a capable and humanist doctor, a convincing teacher, a man of simple and pleasant demeanour and a dedicated worker.

In recognition of the meritorious services Dr. Joseph has rendered in the field of Tuberculosis, the Tuberculosis Association of India decided to award its Gold Medal to him.

## NEWS AND NOTES

### ANNUAL MEETINGS

The 41st Annual General Meeting of the Tuberculosis Association of India will be held on Saturday, the 19th April, 1980, in the Conference Hall of the Association, 3, Red Cross Road, New Delhi. It will be immediately followed by a meeting of the Central Committee of the Association.

A meeting of the Technical Committee of the Association will be held on Friday, the 18th April, 1980. The Conference of Secretaries of State TB Associations will be held in the afternoon on 19th April, 1980.

### CHAIRMAN, TECHNICAL COMMITTEE

Dr. M.M. Singh, Medical Superintendent, Rajen Babu TB Hospital, Kingsway, Delhi, and Honorary General Secretary, Delhi TB Association, has been nominated as Chairman of the Standing Technical Committee of the Association for 1980 *vice* Dr. M.L. Mehrotra, whose term of office expired with the National Conference held in Jaipur in October 1979. Dr. Singh will also preside over the 35th National Conference on Tuberculosis and Chest Diseases to be held in Bombay in November 1980.

### KHUSHI RAM SHIELD

The Association has decided to award the Rat Saheb Khushi Ram Shield for 1979 to the Tuberculosis Association of Andhra Pradesh for their best performance during the year. The Association has also decided to award Certificates of Merit for good performances to the Tuberculosis Association of Tamil Nadu and the Maharashtra Anti-TB Association.

### SEAL SALE AWARDS

The Association has decided to award the TB Seal Shield for highest collections in the 29th Campaign to the Tamil Nadu TB Association and the Runner-up Cup to the Kerala TB Association. The Cup for the best performance made by the smaller States and Union Territories will be awarded to the TB Association of Goa, Daman & Diu. Certificates of Merit for improving the collections will be awarded to the TB Associations of Tripura and Orissa.

### ESSAY COMPETITION—1980

The Tuberculosis Association of India will award a cash prize of Rs. 300/- to a final year medical student in India for an original essay on Tuberculosis, adjudged best by a special committee of this Association. The subject selected for the 1980 competition is 'B.C.G.' The essay should be written in English, typed in foolscap size, double-spaced and should not exceed 15 pages (approximately 3,000 words excluding tables, diagrams, etc.). Four copies of the manuscript should reach the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001, not later than 31st August 1980 and should be forwarded through the Dean or Principal of College/University.

### CHANCHAL SINGH MEMORIAL AWARD—1980

The Tuberculosis Association of India will award a cash prize of Rs. 500 to a TB worker, preferably below 45 years of age, for an original article not exceeding 30 double-spaced foolscap typed pages (approximately 6,000 words, excluding charts and diagrams) on a subject relating to tuberculosis. Papers may be sent in quadruplicate, to reach the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001, latest by 31st August, 1980.

### HEALTH VISITORS' COURSE

The 1980-81 TB Health Visitors' Course will commence in July 1980. The course covers nine months' instruction in tuberculosis, general hygiene, nutrition, communicable disease, home nursing, etc., including two weeks training in a rural centre. The minimum qualification for admission to this course is Higher Secondary/Pre-University with Science or Hygiene and Physiology as one of the subjects. Application forms for admission to this course can be had from the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001. The last date for receipt of applications is 1st May, 1980.

### ANTI-TB DAY PROGRAMMES

The Tuberculosis Association of India and State TB Associations observed the 23rd February 1980, the Foundation Day of the Association, as Anti-Tuberculosis Day throughout the country. The theme selected for the Anti-TB Day for this year was "Tuberculosis is Curable

— Help Fight TB”. During the period from 17th to 23rd February, which was observed as Anti-TB Week, intensive health education programme with emphasis that tuberculosis is preventable and curable was carried out through newspaper advertisements, publication of special articles and write-ups in leading newspapers, like the *Hindu*, *Hindustan Times*, *Indian Express*, *Times of India*, *Patriot*, *Navbharat Times* etc. The All India Radio arranged for some informative talks and interviews to create awareness about the tuberculosis problem, both in English and regional languages. These talks were arranged particularly in Rural, Women’s, Industrial Workers and Children’s programmes. The Delhi Doordarshan telecast a discussion on Tuberculosis in its programme “Ap Ki Sehat” with the help of the illustrated Flip Chart and the Film “TB—Your Enemy”. The Madras Doordarshan also telecast a “Question and Answer” programme on the 18th February. Detailed reports on the observance of the Anti-TB Day in the various States are awaited.

### 35TH NATIONAL CONFERENCE— BOMBAY

The 35th National Conference on Tuberculosis and Chest Diseases will be held in Bombay in November, 1980, under the joint auspices of the Tuberculosis Association of India and the Maharashtra State Anti-TB Association. The subjects tentatively selected for discussion at this Conference have already been mentioned in the January 1980 issue of this Journal. Those who wish to present papers at the Conference may kindly send an abstract of their paper to the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001, immediately.

### ANTI-TB CAMPS

The Maharashtra State Anti-TB Association organised its 134th Anti-TB Camp at High School, Oras, Dist. Ratnagiri on 16th December, 1979, in collaboration with the Jijamata Hospital as part of multi-check up camp. The total registration was 612.

The Association also organised, in coopera-

tion with the Lions Club of Kurla, Anasagur Welfare Association and the local I.M.A. Branch, a Health Week at Anjuman Khairul Islam High School, Kurla, from 17th to 24th February 1980. About 3,850 had medical check up. In all, about 75,000 person-, benefitted by the Camp which organised Health Exhibitions, School Health Education Programmes and fire fighting demonstrations.

### STATE CONFERENCE

The IXth Delhi TB Workers’ Conference was held on 20th February 1980 at Swarni Daya Nand Hospital, Shahdara, Delhi. Shri R.K. Gupta, Mayor, Municipal Corporation of Delhi, presided over the Conference. Addressing the Conference, Dr. M.M. Singh, Honorary, General Secretary, highlighted the activities of Delhi TB Association and the role of care and after care Committees in the control of TB. An Anti-TB exhibition was on show. The Mayor distributed woollen jackets to about 100 TB patients on the occasion.

### DR. B.C. ROY AWARDS

Prof. K.V. Krishnabwami, Professor and Head of the Department of Tuberculosis and Chest Diseases, Madras Medical College, Chest Physician, Government General Hospital Director, Institute of Tuberculosis and Chest Diseases, Chetput Madras-31, and Dr. U.K. Shivpuri of Lucknow are two of the recipients of the Dr. B.C. Roy National Awards this year. Dr. Krishnaswami received the award for his outstanding contributions towards the development of the Speciality of Tuberculosis and Chest Diseases, while Dr. Shivpuri received it for his distinguished service in the field of socio-medical relief. Dr. Krishnaswami is a member of the Standing Technical Committee and Central Committee of the Tuberculosis Association India. He is also a member of the Executive, Central and Technical Committees of the TB Association of Tamil Nadu. Chairman of its Research Committee and a Secretary of the Madras City TB Association. Dr. Shivpuri was Honorary Joint Secretary of the Uttar Pradesh TB Association for the past many years and he is actively associated with many other medical and social welfare organisations.